

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF UTAH

CENTRAL DIVISION

In re: )  
)  
KEITH JONSSON, an individual; )  
MICHAEL JONSSON, an individual;) )  
CEDAR VALLEY FUR FARM, LLC, a )  
Utah limited liability company,) )  
Plaintiffs, )  
)  
v. ) Case No. 2:11-CV-140BSJ  
)  
NATIONAL FEEDS, INC., an Ohio )  
corporation, RANGEN, INC., an )  
Idaho corporation, )  
)  
Defendants. )

Transcript of Jury Trial Testimony  
of Dr. Jeffrey Hall

BEFORE THE HONORABLE BRUCE S. JENKINS

January 14, 2014

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I N D E X

<u>WITNESS</u>	<u>EXAMINATION</u>	<u>PAGE</u>
Dr. Jeffery Hall	Direct By	4
	Mr. Hancey	
	Cross By	62
	Mr. Minnock	
	Cross By	75
	Mr. Mitchell	

EXHIBITS RECEIVED INTO EVIDENCE

<u>EXHIBIT</u>	<u>PAGE</u>
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1           Salt Lake City, Utah, Tuesday, January 14, 2014

2                           \*   \*   \*

3                   (Preceding proceedings not transcribed.)

4       witness Dr. Jeffery Hall.

5                   THE COURT:   Sir, if you'll come forward to  
6       be sworn.   If you'll be sworn, please.

7                           **JEFFERY HALL,**

8       called as a witness at the request of the Plaintiff,

9       having been first duly sworn, was examined

10                   and testified as follows:

11                   THE CLERK:   Please take a seat.   State your  
12       name and spell your name for the record, please.

13                   THE WITNESS:   My name is Dr. Jeffery,  
14       J-e-f-f-e-r-y, middle name Owen, O-w-e-n, last name  
15       Hall, H-a-l-l.

16                           **DIRECT EXAMINATION**

17       **BY MR. HANCEY:**

18           Q.   Good afternoon Dr. Hall.   Can you tell the jury  
19       where you grew up?

20           A.   I grew up on a cattle ranch in southern Oklahoma,  
21       a little town called Cement, Oklahoma.

22           Q.   Where do you currently reside?

23           A.   I reside in Wellsville, Utah.

24           Q.   What brought you to Utah?

25           A.   In a roundabout trip I continued my education,

1 and upon looking for a full-time job was offered three  
2 different jobs, one of which included a teaching, a  
3 research, and a diagnostic component, and since that's  
4 what I was looking for, I opted to take the job at Utah  
5 State.

6 Q. How long have you lived in Utah?

7 A. I took the job at the university in October of  
8 '96.

9 Q. Are you married?

10 A. Yes, I am.

11 Q. Do you have children?

12 A. I have three stepchildren.

13 Q. And what are their ages?

14 A. Let me see, Monica is 30, Justin's 34, and I  
15 think Beth Anne and is 37.

16 Q. Who is your current employer, Dr. Hall?

17 A. Utah State University.

18 Q. What is your occupation or job title there?

19 A. I'm the head of Veterinary Diagnostic Toxicology  
20 at the Utah Veterinary Diagnostic Lab and a full  
21 professor with Utah State University.

22 Q. What is veterinary toxicology?

23 A. Veterinary toxicology is just a veterinary branch  
24 of the overall occupation of toxicology, and toxicology  
25 is the study and treatment of poisons.

1 Q. So is a veterinary toxicology dealing with the  
2 way that toxic substances affect animals?

3 A. Yes, it is.

4 Q. How long have you worked at Utah State? You  
5 might have already answered that.

6 A. Since October of 1996.

7 Q. And how long have you been a full professor  
8 there?

9 A. For five years now.

10 Q. What are you a professor in, or a professor of?

11 A. I'm a full professor in the Animal Dairy and  
12 Veterinary Sciences Department of Utah State University.

13 Q. What do your jobs responsibilities at Utah State  
14 currently consist of?

15 A. I have a three-way split appointment. My  
16 appointment is 55 percent as the head of diagnostic  
17 toxicology at the state veterinary lab, I have a 25  
18 percent research appointment, and a 15 percent teaching  
19 appointment, and then my last 5 percent is what they  
20 call university service for all the committees that I  
21 sit on.

22 Q. Just briefly describe your responsibilities in  
23 each one of those three categories you mentioned.

24 A. I'll start with the smallest percentage. My  
25 university service, I sit on a number of committees,

1 promotion and tenure committees, I sit on the entire  
2 University Animal Use and Care Committee, I also serve  
3 on a variety of post-tenure review committees for the  
4 university, I serve as a reviewer for a number of  
5 research journals, both national and international, I  
6 serve as -- occasionally serve as officer in some of the  
7 scientific organizations that I belong to as well. That  
8 covers my 5 percent university service.

9 My teaching component is 15 percent. I am  
10 the instructor of record for the ADVS 5350/6350 class,  
11 which is introductory pharmacology and pharmacokinetics  
12 class. I also assist teaching the toxicology seminar  
13 series.

14 Q. What about the other two components of your work  
15 there?

16 A. My 25 percent research appointment, I'm a  
17 collaborative scientist with a wide variety of  
18 researchers at Utah State University, at other  
19 universities. I am -- I obtain grant money to perform  
20 the research. I have graduate students that help me  
21 conduct research. Before the economy crashed I had a  
22 full-time technician that helped me with the research as  
23 well, but that went away when the budget got cut. I am  
24 asked and required by the university to produce output  
25 from the research, which includes publications, speaking

1 engagements at scientific meetings.

2 And then my 55 percent diagnostic  
3 appointment I am in charge of all samples that come into  
4 the diagnostic lab that require some type of analytical  
5 testing for toxicology. I handle a lot of phone calls  
6 from producers, from veterinarians, from regulatory  
7 officials on these types of cases. I have to  
8 coordinate. My two analytical chemists actually do the  
9 testing that is required that we have the capability of  
10 doing within our laboratory, then I have to write  
11 summary reports on every case that comes through the  
12 lab.

13 Q. What was your prior place of employment?

14 A. Actually I've held three positions at Utah State  
15 University. I came in as an assistant professor, was  
16 then advanced to an associate professor, and then  
17 advanced to a full professor five years ago.

18 Prior to that I was at the University of  
19 Illinois. I was the assistant director of the Animal  
20 Poison Control Center at the University of Illinois  
21 College of Veterinary Medicine and held an assistantship  
22 as well as the full-time position at the Poison Control  
23 Center at the same time I was working on my PhD.

24 Q. Give the jury a little bit of an idea of what  
25 your responsibilities entailed at the Animal Poison



1 Control Center in Illinois.

2 A. When I first started there basically it's a  
3 matter of answering phone calls. We would get calls  
4 from all over the United States, from the general  
5 public, from veterinarians, from regulatory officials.  
6 We would even get calls from human poison control  
7 centers to see if we had any data that they didn't have.  
8 We would deal with cases, we would have to be able to  
9 take history to find out what type of animals were  
10 involved, what potential exposures may have occurred.  
11 In some cases there was no known exposure and you had to  
12 deal with the clinical signs the animal is showing and  
13 things that the veterinarians had been able to test and  
14 get you some information on to try to paint a picture of  
15 what exactly was going on.

16 As I progressed through the system I  
17 actually became the lead resident at the Poison Control  
18 Center and trained all the new incoming toxicologists on  
19 handling calls, progressed to the point to where I was  
20 actually a full-time employee at the same time I was  
21 working on my PhD, and I did training, supervised phone  
22 calls, reviewed cases on an everyday basis. When I  
23 would get done at 5:00, then I would go back to my  
24 research lab and work until midnight or 1:00 in the  
25 morning on my PhD work.

1                   The last year that I was there we had just  
2 shy of 50,000 cases come through the Poison Control  
3 Center in a single year.

4           Q.   Do you believe your work experience is helpful in  
5 a case like this?

6           A.   All background and work experience in the  
7 veterinary sciences helps you with a case like this  
8 because you have to be able to weed out what is  
9 important, what is not important, and look at the facts  
10 that are presented to you and be able to come to a  
11 reasonable conclusion as to what was happening.

12          Q.   What is your educational background, Dr. Hall?

13          A.   I received my undergraduate degree from Oklahoma  
14 State University in farm and ranch management under  
15 agricultural economics, then went on to veterinary  
16 school at Oklahoma State University, finished my  
17 veterinary degree in 1987. Then I went to the  
18 University of Illinois, did a one-year internship, then  
19 a three-year residency, passed the international  
20 toxicology board exams -- veterinary toxicology board  
21 exams, and then finished my PhD at the University of  
22 Illinois.

23          Q.   Your PhD is in what?

24          A.   Investigational forensic toxicology.

25          Q.   What certificates or licenses do you hold?

1       A. I am currently a licensed veterinarian in the  
2 State of Oklahoma, maintained my Oklahoma veterinary  
3 license after graduation, and I'm also board certified  
4 in veterinary toxicology.

5       Q. Has your background in diagnostic toxicology ever  
6 led you to reach a novel finding?

7       A. Well, my background and experience I've worked on  
8 a lot of different things. When I was actually at the  
9 Poison Control Center I was actually the first person in  
10 the world to ever investigate and then subsequently  
11 prove and publish that Easter Lily is a toxic plant  
12 because all the literature at that time said that it was  
13 not. And that has since been established as a well  
14 known fact in the veterinary profession that that  
15 particular plant is exquisitely dangerous to cats.

16       Q. I'm almost done with your background here. Have  
17 you done any teaching or lecturing in the field of  
18 veterinary toxicology?

19       A. I do teaching and lecturing every year. Just as  
20 an example, last year I did 26 invited speaking  
21 engagements across the United States. Probably  
22 20 percent, maybe 25 percent of those were at veterinary  
23 institutions or other associations where I was actually  
24 training veterinarians and doing continuing education  
25 meetings.

1 Q. Have you published any articles in the fields of  
2 veterinary medicine, toxicology, or veterinary  
3 toxicology?

4 A. I have published in excess of 80 peer reviewed  
5 journal articles in my career. I have published, I  
6 don't know exact numbers, but probably in excess of 30  
7 book chapters. Some of those are directly related to  
8 toxicology, some of those are related to other fields.

9 Q. Now, Dr. Hall, are you familiar with the facts of  
10 this case?

11 A. Yes, sir, I am.

12 Q. Okay. Please explain to the jury what you were  
13 asked to do in this case.

14 A. When I was originally contacted in this case I  
15 was asked if I would serve as a consultant to review  
16 documents to try to help determine what was happening  
17 with an issue of some mink health and mink mortality.

18 Q. Mink belonging to who?

19 A. Actually when I was first contacted it was -- I  
20 was contacted and asked to serve as a consultant for  
21 four different individuals, Kent Griffeth, Mr. Jonsson,  
22 Mr. Jonsson, and the other Mr. Griffeth, and I forget  
23 his first name at this point.

24 Q. What information did you review to try to  
25 accomplish what you were asked to do?

1       A. I asked that I be provided with all documents  
2 available. I was provided a trove of testing reports, I  
3 was provided a number of different depositions from a  
4 number of different individuals, and I think that was  
5 mostly what I was provided initially.

6       Q. Did you interview the Jonssons during your  
7 investigation?

8       A. I visited with the Jonssons I believe one time.  
9 I think it was just one time that we actually visited.

10      Q. Did you make any recommendations during your  
11 investigative period?

12      A. I did. I felt like there was some additional  
13 testing that needed to be done because at the time I did  
14 not believe that what had been initially identified as  
15 the potential problem was the true cause.

16      Q. Now, are the kinds of things that you've just  
17 talked about the types of materials information that  
18 experts in your field normally rely on?

19      A. Actually that's only a part of what you have to  
20 rely on. You have to rely on the pertinent facts that  
21 are presented to you, but you also have to rely on the  
22 scientific literature, investigations that have been  
23 done regarding various toxic substances to try to  
24 determine whether that fits with what's being seen on a  
25 clinical basis, see if that fits with what's being seen

1 as far as an exposure. And so you have to rely on a lot  
2 of literature as well as the pertinent facts that are  
3 presented to you.

4 Q. After you had the chance to look over all the  
5 information that you were presented in this case were  
6 you able to reach a conclusion as to what happened to  
7 the Jonssons' mink?

8 A. Yes, sir, I was.

9 Q. Do you have an opinion, sir, with a reasonable  
10 degree of scientific certainty, about what caused the  
11 Jonssons' mink at the Lehi Ranch to get sick and die?

12 A. Yes, sir, I do.

13 Q. What is your opinion?

14 A. It is my opinion, within a reasonable degree of  
15 scientific certainty, that the lactation crumlets that  
16 were fed to the Jonssons' mink contained toxic substance  
17 and substances that potentially adversely affected the  
18 health of the mink resulting in increased neonatal  
19 mortality within the mink kits.

20 Q. Do you have any other facts upon which you relied  
21 to reach that conclusion?

22 A. Well, the clinical picture that was described to  
23 me, you have to take that into consideration, but there  
24 was another very important fact that was presented to me  
25 that I think is very crucial. Me, as a researcher, when

1 I set up a research study, I want to have controls, I  
2 want to have a population of animals that are not  
3 exposed to something as a direct comparison to a group  
4 of animals that are exposed to something. That's the  
5 only way you can truly compare and determine whether a  
6 population is affected or not. The fact that the  
7 Jonssons had two properties, only one of which were fed  
8 the lactation crumlets, and then the other parties that  
9 also were feeding the lactation crumlets from the same  
10 supply, we had three locations where the lactation  
11 crumlets in question were being fed and one location  
12 where they were not, and the clinical syndrome that was  
13 described to me was described as only occurring at the  
14 three locations where the lactation crumlets occurred,  
15 which basically provided a true control just like you  
16 would set up in a research study.

17 Q. Now, you mentioned as part of your opinion that  
18 there are toxic substances in the lactation crumlets  
19 that caused the mink to get sick and die. What are  
20 those substances you were referring to?

21 A. The substance that were identified is -- in the  
22 documentation of the analytical testing there was  
23 identified concentrations of histamine in the lactation  
24 crumlets that were at concentrations high enough to  
25 adversely affect mink. Also within the lactation

1     crumlets there was identified nitrosamines, a toxic  
2     substance that mink are exquisitely sensitive to, and  
3     those concentrations were deemed to be of a  
4     concentration high enough to produce adverse health  
5     effects in the mink as well.

6           Q.   When you were first asked to investigate the  
7     facts of this particular case, Dr. Hall, were  
8     nitrosamines one of the substances that had been tested  
9     for in the crumlets?

10          A.   No, sir.

11          Q.   Who made that suggestion to test for  
12     nitrosamines?

13          A.   I did, sir.

14          Q.   Why did you make that suggestion?

15          A.   There was some testing that had been done that  
16     had identified high concentrations of nitrites in the  
17     lactation crumlets and a fish meal that was tested at  
18     the same time. Nitrites in the presence of biogenic  
19     amine compounds which occur readily in fish can be  
20     chemically converted into nitrosamines, and that's one  
21     of the reasons nitrites are typically not used as  
22     preserving agents for feeds, foods, and things of that  
23     nature anymore is because of the potential for this  
24     development of toxic substances.

25          Q.   Okay. Now, can you describe for the jury what



1 nitrosamines are.

2 A. Nitrosamines are a very large chemical class of  
3 compounds that contain generally one or two side chain  
4 nitrogens as well as side chain small carbon groups. It  
5 is a large class. There are well over 200 different  
6 nitrosamines that have been identified to date. The big  
7 reason that they are of concern is because they have a  
8 high potential for development of cancer.

9 Q. How do nitrosamines form from nitrites?

10 A. Biogenic amines in foods materials in the  
11 presence of nitrites and in an acid environment  
12 basically can spontaneously, to some degree, but  
13 increased with temperature, so as you heat or cook, that  
14 combination, that it results in the formation of  
15 nitrosamines. A good example of that is bacons used to  
16 be preserved with nitrites and it was found that bacon  
17 preserved with nitrites in the cooking process form  
18 concentrations of nitrosamines that are potentially  
19 dangerous. And so that heating process, as well as the  
20 chemicals being present that heat provides the energy  
21 necessary for the chemical reaction for the formation.

22 Q. You might have already answered this, but for  
23 clarity sake, what exactly are nitrites that form into  
24 nitrosamines?

25 A. Nitrites are just a nitrogen molecule with oxygen

1 components that is a chemical form of nitrogen.  
2 Nitrites, and one of the reasons nitrites are used -- or  
3 historically have been used as preserving agents is  
4 because they can inhibit bacterial growth to a degree,  
5 and so nitrites are basically a very small molecule that  
6 happen to have the benefit of inhibiting bacterial  
7 growth, so they started using it as a preserving agent  
8 long ago.

9 Q. You may have just answered my next question, but  
10 my question is what commercial uses do nitrites have?

11 A. Nitrites -- there's a variety of commercial uses.  
12 Nitrites are used -- historically have been used as  
13 preserving agents, much less today than they once were.  
14 Nitrites in some chemical forms are applied as  
15 fertilizers to soil. Nitrites are used in a variety of  
16 chemical synthetic reactions. And so nitrites can be  
17 used for a lot of different things.

18 Q. Are you aware of nitrites being used in the  
19 commercial context as a preservative in fish meal  
20 products?

21 A. Historically nitrites and formaldehyde were  
22 probably the two most common preservative agents used in  
23 fish meal. That's not true today, but historically  
24 that's true.

25 Q. When can nitrites be added as a preservative to

1 something like fish or fish meal?

2 A. Nitrites can be added to fish or fish meal  
3 anywhere along the process from the time of harvest,  
4 i.e., when the fish are caught. You know, as -- because  
5 of the potential of bacteria to affect the integrity of  
6 fish it was not uncommon to use a nitrite salt  
7 immediately upon gutting and cleaning the fish onboard  
8 the ship right after they were caught. It can be used  
9 anywhere along the process, including during the  
10 grinding and processing, cooking and preparing of the  
11 fish meal itself, it can be used anywhere along that  
12 stream.

13 Q. What risks, Dr. Hall, if any, are there  
14 associated with using nitrites to preserve fish or fish  
15 meal for use in an animal feed?

16 A. The risk has come back to the potential for  
17 formation of nitrosamines. In the early '60s there were  
18 a number of cases of livestock and mink that were being  
19 fed a diet that contained a high fish meal component  
20 that subsequently died, and that was tracked back and  
21 traced back to nitrosamines as being the causative  
22 agent.

23 Q. Now, are there different types of nitrosamines?

24 A. I mentioned earlier there's in excess of 200  
25 different known nitrosamine compounds.

1       Q.   What are the most common types of nitrites that  
2   are used as preservatives in ingredients?

3       A.   I don't know that I can say specifically the most  
4   common type.   The one I'm familiar with, that I'm  
5   familiar with its use, is basically it's just a sodium  
6   nitrite salt.

7       Q.   Okay.   Are you aware of whether nitrosamines have  
8   any kind of a health effect on mink?

9       A.   Mink have been reported to be one of the most  
10   sensitive mammalian species to nitrosamines.

11      Q.   What effect do nitrosamines have, Dr. Hall, on  
12   mink?

13      A.   Okay.   The effect is -- that's a broad question  
14   because the answer is it depends on the dose.   At very  
15   high doses, or relatively high doses comparatively, of  
16   several part per million in the diet, the animals can  
17   die of liver failure within a matter of days.   At lower  
18   concentrations the animals can develop liver damage that  
19   results in fibrosis and scarring of the liver to where  
20   they die of liver failure, you know, weeks after  
21   exposure starts.   At even lower concentrations they can  
22   develop cancer that can kill them months to a year or  
23   more after exposure starts.   So what you see in mink  
24   depends upon the rate of exposure.   With lower  
25   concentrations seeing more effect on some scarring and

1 cancer; moderate concentrations a more direct liver  
2 damage effect; and with the highest concentration  
3 basically it wipes the liver out so fast that it kills  
4 the animal pretty quickly.

5 Q. Are nitrosamines known to have any kind of  
6 reproductive effect on mink as a species?

7 A. When you deal with toxicants it's not uncommon  
8 that an individual species may not have been tested for  
9 a specific entity. I am unaware that specific studies  
10 have been established to look specifically at the  
11 reproductive indices in mink associated with nitrosamine  
12 exposures.

13 Q. We'll get back to that in a second.

14 How does the effect of nitrosamines on mink  
15 broadly speaking compare to its effect on other animals  
16 based on your review of the literature?

17 A. It's fairly similar across species, but it  
18 depends somewhat on the specific nitrosamine of  
19 interest, and it also depends somewhat on the overall  
20 exposure. With ingested nitrosamines some of them, in  
21 fact, most of them are more predominantly damaging to  
22 the liver. There are some that have some damage to the  
23 kidney effects as well. There are some that have mixed  
24 effects. There are some that when inhaled produce lung  
25 tumors. Nitrosamines in cigarette smoke are one of the

1 reported causes of lung tumors from cigarettes.

2 Q. Do you have an opinion on the commercial use of  
3 nitrites as a preservative for ingredients used in mink  
4 feed?

5 A. Since mink are exquisitely sensitive to the  
6 nitrosamines, that's been fairly well documented, the  
7 lethality dose at acute, subacute, and even chronic is  
8 lower, it takes much less of it to actually cause those  
9 effects than it does in other species, I consider it a  
10 danger to use nitrite-preserved fish products in any  
11 mink type feed.

12 Q. Should nitrites be used as a preservative for  
13 ingredients in a facility that manufactures mink feed?

14 MR. MITCHELL: Objection, lacks foundation,  
15 Your Honor. He's not a feed maker.

16 THE COURT: Overruled.

17 Q. (By Mr. Hancey) You can answer.

18 A. And the answer to that is in a controlled  
19 environment if they're separated in such a way that  
20 there's no way they can come in contact with each other,  
21 then there wouldn't be any harm in having nitrites in  
22 the same facility as a facility that's making mink feed.  
23 If there is any potential for cross-contamination or  
24 exposure, then, yes, that would pose a risk.

25 Q. What if the same mixing unit is being used to

1 manufacture different kinds of feeds, would that be a  
2 possible cause of cross-contamination?

3 A. And that comes back to the -- I am somewhat  
4 familiar with feed mixing operations because I deal with  
5 that through my work. If the plant had standard  
6 operating procedures in place to where they had adequate  
7 clean out between batches and that they tested to prove  
8 that that adequate clean out was effective and sound,  
9 then it still poses a risk, but a lesser risk.

10 Q. Okay. Now, Dr. Hall, is any amount of  
11 nitrosamine poisonous if ingested by a mink?

12 A. You can't say any amount, no, sir.

13 Q. Are you aware of any studies that analyzed the  
14 concentration of nitrosamines that would be harmful if  
15 ingested by a mink?

16 A. Yes, sir.

17 Q. And what do those studies say?

18 A. The studies show that concentrations as low as  
19 .1 milligram per kilogram of body weight per day is  
20 toxic to mink. And the studies -- there's other studies  
21 that show as low as .3, there's studies that show as low  
22 as .13, there's -- it depends upon the way the  
23 individual study was set up. With a lot of these  
24 studies what they refer to is a minimum toxic level  
25 observed within the study. Well, is that minimum toxic

1 level observed within the study the lowest dose they  
2 tested? In several of these studies that's what it came  
3 down to. So there's a gray zone between that lowest  
4 dose that's known to cause an effect and zero. Just  
5 because they didn't test the doses in-between, they know  
6 that this dose is toxic but they don't know if anything  
7 lower is.

8 Q. Now, you mentioned that the known toxic  
9 concentration of nitrosamines, I think, is one -- I'm  
10 not good with the metric system, but I think you said 1  
11 milligram per kilogram of body weight; is that correct?

12 A. As low as 0.1.

13 Q. 0.1. Can that metric equation be translated into  
14 a parts per million context?

15 A. Okay. Milligram per kilogram of feed is the same  
16 thing as a part per million. When you are talking  
17 milligram per kilogram of body weight exposure, that's  
18 not a part per million. So you have to be careful in  
19 your interchangeability of those units.

20 Q. Are you aware of any studies that talk about the  
21 parts per million of nitrosamines in feed that can be  
22 harmful if ingested by mink?

23 A. I have seen those studies. Most of those studies  
24 I look at it based on milligram per kilogram of body  
25 weight, so I go through all the math to calculate what



1 the true exposure rate to the animal was, rather than  
2 looking at the concentration in the feed.

3 Q. Now, do the studies that you've referenced, the  
4 ones that you've looked at over your career, do they --  
5 were those studies done on mink that were pregnant or  
6 not pregnant, do you know?

7 A. The majority of them were done on mink that were  
8 nonpregnant. There was one study that had an overlap to  
9 where -- it was a cancer study to where they  
10 specifically were looking at the effects of nitrosamines  
11 at causing cancer initially in a full population, and  
12 then they had a subpopulation that they bred and  
13 followed the babies out to follow the cancer rate out up  
14 to a few hundred days. Actually in that study their  
15 statement was that nitrosamines basically for a long  
16 enough period of time at a concentration that is  
17 effective will produce cancer in 100 percent of the  
18 animals.

19 Q. Okay. What would be a poisonous concentration of  
20 nitrosamines to a pregnant mink?

21 A. The exact answer to that is unknown. We can do a  
22 certain amount of extrapolation based on what we know in  
23 other species. That's a thing that's done in  
24 toxicology. It's actually done in medicine quite  
25 commonly. As an example, you know, looking at a new

1 drug you're not going to take that new drug and dose a  
2 few hundred people to find out how toxic it is. You  
3 have to do it in animals to determine how safe the drug  
4 is. The same thing is done in toxicology, you're not  
5 going to go in and determine the toxic dose of an  
6 individual compound in every species known to man just  
7 so you have that answer. You do it in a subset  
8 population, and then you do a certain amount of  
9 extrapolation between the different species to determine  
10 what the potential risk is.

11 Q. How do you use interspecies extrapolation to  
12 resolve the issue of what concentration of nitrosamines  
13 would be harmful to a pregnant mink?

14 A. Okay. There are studies in mice, in pregnant  
15 mice and pregnant rats. You have to be very careful  
16 when you do the extrapolation because a number of the  
17 studies in pregnant rats they gave as a single very  
18 large dose sometime during pregnancy and then looked at  
19 the cancer risks in the offspring. That does not fit  
20 well with the scenario we're dealing with here where  
21 it's being ingested over a several day to week period of  
22 time. So you have to be careful in the studies that you  
23 evaluate in order to do interspecies extrapolation.

24 The first thing I generally do is I look  
25 back at what is known, what is the toxic dose acutely,

1 subacutely, and chronically in each individual species  
2 where it has been tested. So in this particular case I  
3 look back, there is a lot of data on acute, subacute,  
4 and chronic toxicity in rats, in mice, and there is some  
5 data available on acute, subacute, and chronic toxicity  
6 in mink. And across the board mink are more sensitive  
7 than rats and mice.

8           Then you actually take the studies that are  
9 applicable, that are oral exposure. I don't want to  
10 obviously look at studies that are inhalation exposure  
11 because that doesn't fit with this case. But with oral  
12 exposure you look at studies to where they have truly  
13 monitored reproduction. That's difficult because  
14 there's not a lot of them. Most of the studies done  
15 with nitrosamines, because it is highly carcinogenic,  
16 have been set up to specifically look at cancer effects.  
17 And when you specifically set studies up to look at  
18 cancer effects, you often don't have appropriate  
19 controls or appropriate mechanisms for interpreting what  
20 it's doing in a pregnancy situation that may affect the  
21 viability or the survivability of a neonate or a fetus.  
22 And so some of the studies are difficult to interpret,  
23 but there are good studies in mice that were very  
24 rigorously designed to specifically look at neonatal  
25 health and neonatal mortality with the nitrosamines.

1 Q. Describe those studies briefly and how you  
2 applied them to the facts of this case.

3 A. Okay. There's two very good studies in mice.  
4 One of them the mice were dosed with 0.1 parts per  
5 million dimethylnitrosamine, which is one specific class  
6 of nitrosamine, or one specific compound of that entire  
7 class, at 0.1 parts per million in the water. They  
8 started the mice on the dimethylnitrosamine in the  
9 water. I don't remember the exact number of days, but  
10 it was I think 40 or 60 days prior to breeding,  
11 continued them on that material in the water throughout  
12 gestation and in the post-gestational period. They  
13 monitored the animals for pup numbers per litter, pup  
14 survival, number of pups born dead, number of pups that  
15 died in that early postpartum period, and found that  
16 there was over a 10 percent increase in the number of  
17 neonatal mortality. That was statistically significant  
18 comparing between the treatment group that got no  
19 nitrosamines and the group that got nitrosamines in that  
20 particular study.

21 Q. When you reference neonatal mortality, what do  
22 you mean?

23 A. Neonatal mortality, death in a time period very  
24 close to birth.

25 Q. To the young or to the offspring of the parent?

1           A.    Correct, to the offspring of the parent.

2                       There was another study where they actually  
3   dosed mice with 0.01 parts per million  
4   dimethylnitrosamine in the water, and looked at the  
5   effect.  In that particular study they found increased  
6   amount of cancer in the offspring.  So we do know that  
7   at least in pregnant mice that the effect on the  
8   offspring can be as low as 0.01 parts per million in  
9   water, and since mice consume approximately the same  
10  amount of water as they do dry matter food intake per  
11  day that can then be cross-correlated with an  
12  approximately identical concentration in food, and since  
13  we know that mink are more susceptible than mice at all  
14  the other parameters that have ever been measured as far  
15  as acute, subacute, and chronic fatality, you can make  
16  the -- within a reasonable degree of scientific  
17  certainty, you can make the jump that mink would be  
18  equally more sensitive to the effects on reproduction.

19          Q.    In other words, pregnant mink would be harmed by  
20  concentrations of nitrosamine at less than .01 parts per  
21  million.

22          A.    Yes.

23          Q.    How do you know that the lactation crumlets that  
24  were fed to the Jonssons' mink contained nitrosamines?

25          A.    There was analytical testing done on the crumlets

1 from the same shipment that contained nitrosamines.

2 Q. Now, who ordered the lab reports that you  
3 reviewed in your investigation in this case?

4 A. There were a lot of lab reports in what I  
5 reviewed. They were odored by just about everybody  
6 involved at one point or time if you look at the total  
7 breadth of what I reviewed. Some of the lab reports  
8 were ordered by the Jonssons. There were other lab  
9 reports that were ordered by Kent Griffeth.

10 Q. Did you order some?

11 A. There were lab reports that I ordered as well.

12 Q. There's an exhibit book in front of you, sir,  
13 that rather large binder there, could I have your  
14 attention directed to tab number 16 please.

15 A. You said 16, sir?

16 Q. Yes, sir. I want to direct your attention  
17 specifically -- that exhibit contains four pages.

18 A. Excuse me, sir, just for clarification is it the  
19 pages in front of the tab or the pages after the tab?

20 Q. Following the tab, yes.

21 A. Thank you, sir.

22 Q. Yes, sir. Now, there are four pages there. If  
23 you'll focus your attention for a minute on the last  
24 three pages in that exhibit, do you recognize those  
25 three pages?

1 A. Yes, sir.

2 Q. Okay. And what are they?

3 A. Okay. They are three different samples that I  
4 requested analysis at Adamson Analytical Labs for  
5 nitrosamines.

6 Q. You sent these samples in yourself.

7 A. Yes, sir.

8 Q. Now, for these particular reports in question,  
9 what samples did you use?

10 A. I obtained samples from Mr. Kent Griffeth. He  
11 actually drove down to the lab. On one of the samples,  
12 it would be on page 2 --

13 Q. Just for the record, there's a number in the  
14 bottom right-hand corner that would be 2243?

15 A. Yes, sir.

16 Q. Okay. Go ahead.

17 A. On 2243 the sample name is Mink Lactation  
18 Feed-Kent 11/29/11. The sample was brought to me on  
19 November 29, 2011, and it was in a bag that had already  
20 been sampled by Mr. Kent Griffeth.

21 Q. Okay.

22 A. The next page, 2244, it says, Bag Number 2  
23 Unopened Bag Mink Lactation Feed-JOH-11/29/11. That  
24 sample was brought on November 29, 2011. It was an  
25 unopened bag of crumlets that I personally opened in

1 order to sub-sample.

2 Q. Okay. And the next one?

3 A. The next one says Bag Number 4 Fish Meal-Kent  
4 11/29/11. That was a sub-sample of fish meal that  
5 Mr. Griffeth brought me on that same November 29, 2011  
6 date.

7 Q. Now, are you familiar with the method by which  
8 Kent Griffeth sub-sampled the samples he gave to you?

9 A. Mr. Griffeth explained to me that he had a bag of  
10 the lactation crumlets, that he just went in and scooped  
11 some of it out was the way he described it to me.

12 Q. Did he describe to you any special care or  
13 precaution he took to ensure the sample he was giving  
14 you was sterile or intact?

15 A. He indicated to me that he -- the sample had been  
16 retained since the initial incident with the mink mother  
17 and kits, that it had been retained on a pallet in a  
18 cool room at a controlled environmental temperature, and  
19 that he had just sub-sampled one of the bags out of that  
20 controlled environment.

21 Q. How did you come to receive an unopened bag of  
22 lactation crumlets for sampling purposes?

23 A. I specifically told Mr. Griffeth when he asked me  
24 that he wanted -- when I suggested that the nitrosamines  
25 be tested for, I told him that the best thing was if I



1 had an unopened bag that I could sample from.

2 Q. Why?

3 A. Because that provides the utmost in chain of  
4 custody. If the bag is unopened, then the likelihood of  
5 any type of adulteration to that bag is minimized.

6 Q. Do you understand that bag to have been taken  
7 from the same refrigerated cooler you discussed earlier?

8 A. That's the way I was instructed, yes, sir.

9 Q. Please just briefly describe for the jury your  
10 methodology for extracting the sample you took from the  
11 unopened bag.

12 A. I cut the top of the bag open. I have a sterile  
13 clean plastic sampling bag that I then sub-sampled  
14 directly out of the intact bag into. After I obtained  
15 the sample and took the samples that Kent had already  
16 sub-sampled out of another bag for me, I placed them in  
17 a controlled environment freezer at the veterinary  
18 diagnostic lab until I had the analyses performed.

19 Q. Until you mailed the samples to the labs?

20 A. That's correct.

21 Q. Did you mention whether or not you wore gloves  
22 when you personally sub-sampled from the unopened bag?

23 A. I didn't mention, but yes, I do.

24 Q. Now, on what date did you actually send these  
25 samples that you say you put in the freezer at the Utah

1 State lab in for testing at the independent  
2 laboratories?

3 A. They were actually sent in in March of 2012.

4 Q. Why the time delay between when you received the  
5 samples and the time you sent them in for testing?

6 A. I began a search for a lab that would test feed  
7 material for nitrosamines. I found numerous labs  
8 throughout the United States that test water on an  
9 everyday basis, but none of them had a methodology  
10 established and certified for testing feeds. I had  
11 several tell me that they would try, but in a case like  
12 this you don't want somebody that's going to try, you  
13 want somebody that has experience doing it that you can  
14 trust the results. And it took me a period of time to  
15 find a lab that met those qualifications.

16 Q. What significance, if any, do you attach to the  
17 period of time that lapsed between when you obtained the  
18 samples, froze them, and sent them off to the  
19 independent laboratories?

20 A. That timeframe would have had no bearing because  
21 the samples were frozen.

22 Q. What bearing, if any, would any time lapse  
23 between the time the -- well, from -- well, let me  
24 strike that question and ask it this way.

25 Do you know, or have an idea of when the

1 lactation crumlets were processed by Rangen?

2 A. I don't remember the exact date. I know I've  
3 seen it. I know it was in the late spring of 2010.

4 Q. Kent Griffeth and Keith Jonsson have testified in  
5 this case that they received their order of crumlets in  
6 about the latter part of April, does that sound about  
7 right to you?

8 A. That sounds familiar, yes, sir.

9 Q. If that is true, Dr. Hall, do you attach any  
10 significance to the time lapse between when the Jonssons  
11 and Griffeths received their order of lactation crumlets  
12 and the time you received the samples that you  
13 ultimately sent in for testing?

14 A. Could you clarify the question please.

15 Q. Do you attach any significance to any time lapse  
16 there was between the time the parties in this case  
17 first obtained their order of lactation crumlets and the  
18 time you received the samples that you sent in for  
19 testing?

20 A. Because the samples were stored under a  
21 refrigerated condition I don't feel that the time has  
22 any bearing on the analytical results.

23 Q. Why not? What does that have to do with, I don't  
24 know, quashing any of your concerns?

25 A. Nitrosamines typically are formed at higher

1 temperatures, during cooking processes and things of  
2 that nature. In a refrigerated storage unit you're not  
3 going to have the heat necessary for that chemical  
4 conversion to actively cause that chemical reaction.

5 Q. Is the methodology you described by which you  
6 obtained the sub-samples from the unopened bag, froze  
7 them, and then sent them into the laboratories something  
8 that is an acceptable practice in the field of  
9 toxicology?

10 A. I deal with sub-sampling materials all the time  
11 in sending it to outside labs. I took the same natural  
12 precautions that I do. Any time I do that I try to  
13 prevent any contamination. I sample with clean gloves,  
14 put into clean sterile bags, maintain it in a controlled  
15 environment during any holding time, anything necessary  
16 to just verify that the sample integrity is retained.

17 Q. Do you have any concerns about any of the lab  
18 reports, the Adamson Lab reports, that are contained in  
19 Exhibit 16?

20 A. I don't have any concerns about any of them, no,  
21 sir.

22 Q. Okay. Did you receive the second, third, and  
23 fourth pages of Exhibit 16 back from the Adamson Lab?

24 A. I received those back directly from the  
25 laboratory, yes, sir.

1 Q. Now, let's focus on the first of those lab  
2 reports for a minute, Dr. Hall, that's again page 2243,  
3 do you have that?

4 A. Yes, sir.

5 Q. What does this first lab report from Adamson tell  
6 us about the lactation crumlets?

7 A. Okay. You said 2243?

8 Q. That's correct.

9 A. There was actually three different nitrosamines  
10 analyzed for. All three of them were detected by gas  
11 chromatography, the nitrosodiethylamine,  
12 nitrosodimethylamine, and nitrosodibutylamine at  
13 concentrations of 0.28, 0.12, and 0.39 parts per  
14 million.

15 Q. What about the second lab report, that would be  
16 2244, what does that tell us?

17 A. The same three nitrosamines were detected at  
18 concentrations of 0.4, 0.22, and 0.74 parts per million.

19 Q. And the third lab report, page 2245?

20 A. And the third lab report is the one that deals  
21 with the fish meal, and it had nitrosamines at -- let's  
22 see, nitrosodiethylamine at 0.63, nitrosodimethylamine  
23 at 0.34, and nitrosodibutylamine at 0.46 parts per  
24 million.

25 Q. What is the difference between the three kinds of

1 nitrosamines being tested for in these lab reports?

2 A. These are three common nitrosamines.

3 N-nitrosodimethylamine is actually one of the most toxic  
4 of the nitrosamines. It is the one that has had a vast  
5 amount of research done on it. The nitrosodiethylamine  
6 is slightly less toxic, and n-nitrosodibutylamine is the  
7 least toxic of these three, but all three of them are  
8 still toxic.

9 Q. What significance do you attach to the fact that  
10 all three of these lab reports show that there are  
11 nitrosamines in three different types in the lactation  
12 crumlets?

13 A. That gives me confidence that the results are  
14 real, that the lactation crumlets were contaminated with  
15 nitrosamines.

16 Q. What possible explanations are there for the  
17 presence of nitrosamines in the lactation crumlets?

18 A. The most common source of nitrosamines in feeds  
19 and forages is associated with fish meal inclusion in  
20 diets, although it's not exclusive because you can get  
21 small amounts of nitrosamines from other sources, other  
22 contaminations, but the most common is associated with  
23 fish meal inclusion in diet formulations and that fish  
24 meal having been preserved with nitrites.

25 Q. Are you familiar with the ingredients that went

1 into the lactation crumlets?

2 A. I have reviewed that document. I don't know it  
3 by heart, but I have reviewed it.

4 Q. Do you know whether or not fish meal is one of  
5 the ingredients in that product?

6 A. As I remember, fish meal is one of the  
7 predominant ingredients in that product.

8 Q. Based on your experience and knowledge, what  
9 ingredients do you believe are most likely to have been  
10 contaminated or preserved with nitrites that make up the  
11 lactation crumlets?

12 A. The fish meal.

13 Q. Did you determine at what point the nitrites were  
14 introduced into the crumlet ingredients?

15 A. No, sir.

16 Q. Let me direct your attention now, Dr. Hall, to  
17 what's been marked as Exhibit 17. Do you have that?

18 A. Yes, sir.

19 Q. I want to focus your attention on the first page,  
20 which again down at the bottom is 1118, do you see that?

21 A. Yes, sir.

22 Q. Now, is this one of the lab reports that you  
23 reviewed as part of your investigation into this case?

24 A. Yes, sir, it is.

25 Q. Okay. And this is a lab report from a laboratory

1 called NSF Surefish, correct?

2 A. That is correct.

3 Q. Tell us what this report indicates as far as the  
4 case is concerned.

5 A. There was a sample sent by Mr. Kent Griffeth to  
6 the NSF Surefish laboratory, requested sampling to be  
7 tested for formaldehyde and sodium nitrite. It  
8 contained formaldehyde at 45 parts per million and  
9 sodium nitrite at 1.57 percent.

10 Q. What is the significance of this finding of  
11 sodium nitrite in the fish meal that was tested here?

12 A. It's not so much the significance of the fact  
13 that it was found, it was the fact that it was found at  
14 1.57 percent. That's an extremely high occurrence, and  
15 the only way you would ever see that amount of sodium  
16 nitrite in a fish meal sample would be if that fish was  
17 preserved with sodium nitrite.

18 Q. Let me direct your attention to the second page  
19 in that exhibit, page 1119, do you see that?

20 A. Yes, sir.

21 Q. Is this a lab report that made up part of your  
22 investigation in this case?

23 A. Yes, sir.

24 Q. Okay. What is its significance?

25 A. It is another sample. It is a lactation feed



1 sample, it says Fish Meal Lactation Feed, that was sent  
2 in for testing for formaldehyde and sodium nitrite. It  
3 contained formaldehyde at 110 parts per million and  
4 sodium nitrite at 1.5 milligrams.

5 Q. What's the significance again of this lab report?

6 A. The fact that the sodium nitrite is present in  
7 the final feed.

8 Q. In the lactation crumlets.

9 A. In the lactation crumlets, indicates that there  
10 was a contamination of an ingredient that went into that  
11 lactation crumlets. There again, since the fish meal  
12 that was tested was identified to me as being obtained  
13 from Rangen at the same time period as the lactation  
14 crumlets, that would indicate that the fish meal onsite  
15 at the time the lactation crumlets was made had the  
16 potential to be contaminated with sodium nitrite or  
17 preserved with sodium nitrite, the fact that sodium  
18 nitrite is in the final product indicates that a fish  
19 meal that had been preserved with sodium nitrite was  
20 used in the lactation crumlets.

21 Q. Now, what do the nitrosamine concentrations  
22 identified in the lab reports we've looked at so far  
23 tell you about the nitrosamine concentrations that were  
24 present in the feed at the time it was eaten by the  
25 Jonssons' mink?

1       A.   Since the nitrosamines are typically formed at an  
2   acid environment at higher temperatures and since the  
3   material had been stored under refrigerated conditions,  
4   the nitrosamine concentration at the time of feeding  
5   should be similar, if not identical, to the  
6   concentration that was present at the time of testing  
7   and feeding both.   Because nitrosamines have some  
8   volatile characteristics, there is the possibility that  
9   some of the nitrosamines present in the lactation  
10  crumlets volatilized off over time, and so the  
11  concentration in what was tested may have actually been  
12  lower than what was actually in the feed at the time of  
13  feeding.

14       Q.   Now, the Jonssons have testified over the last  
15  couple of days that when they fed their mink in the  
16  spring of 2010 they mixed bags of lactation crumlets in  
17  with feed, regular mink feed they got from their co-op;  
18  are you familiar with that testimony?

19       A.   Yes, sir, I am.

20       Q.   What bearing does that fact have on your analysis  
21  of how much nitrosamine was in the mink diet at the time  
22  they ate the lactation crumlets?

23       A.   When you have multiple ingredients in a feeding  
24  situation you have to take into effect dilutional  
25  calculations, and so you have to actually calculate what

1 the final concentration was. I do it on a dry-matter  
2 basis because doing it on a dry-matter basis makes it  
3 much easier to convert between species, especially when  
4 you're doing interspecies extrapolation. When looking  
5 at the mice and the rat studies when it's fed to them  
6 it's fed in a pelleted feed that is relatively a  
7 dry-matter basis at the time of feeding. So in order to  
8 do a direct one-to-one comparison you need to actually  
9 evaluate the mink feed on a dry-matter basis as well.  
10 That way you're comparing apples and apples instead of  
11 apples and oranges.

12 Q. When you talk about a dry-matter basis what are  
13 you referring to?

14 A. Any dietary ingredient can have a certain amount  
15 of water. An apple, for example, may be 50 percent  
16 water if you actually dried it and weighed it before you  
17 dried it and weighed it and after you dried it. So the  
18 dry-matter basis is the dried apple, the wet matter  
19 basis is the apple intact is a good way to describe it.

20 Q. Okay. And what is your understanding of the  
21 composition of the co-op feed the Jonssons were  
22 including in this mixture in the spring of 2010?

23 A. When the co-op feed was originally described to  
24 me the actual characteristics of the co-op feed was not  
25 adequately described to me. I found out during the

1 process of the investigation towards the latter end of  
2 preparing for this trial, that the co-op feed actually  
3 contained a significant amount of water.

4 Q. What percentage of water?

5 A. It varied. It was in some cases as much as 66,  
6 67 percent. In some cases it was as little as  
7 50 percent. But there was a wide variability in the  
8 amount of water.

9 Q. Is there water content to some extent in the  
10 lactation crumlets that were fed in 2010?

11 A. It's very small. I had one sample that I did dry  
12 just for curiosity and it was about 6 percent moisture  
13 was all.

14 Q. What is your understanding, Dr. Hall, of the  
15 ratio of co-op feed, water, and lactation crumlets that  
16 the Jonssons fed to their mink in the spring of 2010?

17 A. The way it was described to me was that the ratio  
18 of mixing was roughly 20 to 25 percent lactation  
19 crumlets, 75 to 80 percent co-op feed, and that's the  
20 way it was originally described to me. In review of  
21 depositions there was also some water added to that  
22 mixture, but that is not the way it was originally  
23 described to me because I told them that I just wanted  
24 to know how the feed itself was mixed.

25 Q. Once you eliminate all of the moisture or water

1 from the co-op feed and the crumlets and the water that  
2 the Jonssons added to that mixture, what concentration  
3 of nitrosamines was in the mixture at the time it was  
4 fed to the Jonssons' mink in Lehi?

5 A. If I remember the calculations correctly, I  
6 provided those documents to you, it was up to .1 part  
7 per million in the final dry matter diet.

8 Q. Up to what, I'm sorry?

9 A. 0.1 part per million in the diet, or milligram  
10 per kilogram of diet, either way.

11 Q. Does that 0.1 number have any significance to  
12 you?

13 A. Yes, because at concentrations that are identical  
14 there were reproductive issues, neonatal mortality,  
15 neonatal deaths, and stillborns in the mice study that  
16 was dosed in water at the same concentration, and since  
17 mice drink approximately the same amount of water as  
18 they eat feed, that would be directly correlated to a  
19 food intake, so the mink were ingesting an equal  
20 concentration to what was toxic in mice, and we know  
21 that mink are more sensitive than mice.

22 Q. Now, when you say at .1 percent, are you  
23 referring to one type of nitrosamine or all of the  
24 nitrosamines that were tested for?

25 A. Okay. It was not .1 percent, it was .1

1 milligrams per kilogram of feed, and that was just in  
2 nitrosodimethylamine. That did not account for any of  
3 the other nitrosamines tested.

4 Q. What bearing do those other kinds of nitrosamines  
5 that were found in the lactation crumlets have on your  
6 analysis?

7 A. The other nitrosamines are toxic as well, they're  
8 just not as toxic. As an example, the  
9 n-dibutyl nitrosamine has been referenced to be less than  
10 one tenth of the toxicity of the dimethyl nitrosamine,  
11 and diethyl nitrosamine falls between those two. So  
12 they're not as toxic, but they are still toxic. You  
13 can't add them together and look at a total number  
14 because they vary in toxicity and there's not as much  
15 data available to evaluate for the dibutyl or the  
16 diethyl nitrosamines as there is the dimethyl nitrosamine.  
17 But they have the potential of causing additive effects  
18 to what has been described for the dimethyl nitrosamine.

19 Q. I believe you stated earlier, correct me if I'm  
20 wrong, that in your opinion the nitrosamine  
21 concentration that was in the feed at the time it was  
22 tested is the same as the nitrosamine concentration in  
23 the crumlets at the time they were manufactured or fed  
24 to the Jonssons' mink; is that a fair characterization  
25 of your testimony?

1       A. From a science standpoint you can't say it's the  
2 same. You can say that within a reasonable degree of  
3 scientific certainty the concentration identified at the  
4 time of testing should be nearly identical to that which  
5 was present at the time of feeding.

6       Q. What are the clinical symptoms for nitrosamine  
7 poisoning, Dr. Hall?

8       A. Nitrosamine poisoning, it can vary. And there  
9 again it comes back to dose. The more acute higher  
10 doses that cause very sudden disease and very sudden  
11 onset of illness, animals become very depressed, they  
12 will actually back away from feed, quit eating, become  
13 reclusive. One of the reports described them as  
14 basically hiding behind cages. You know, they just  
15 don't feel good. I mean they don't act or behave  
16 normally. As you get later into the syndrome in those  
17 doses the animals are dying of liver failure. So  
18 there's also the possibility of them developing icterus  
19 or jaundice, or a yellow-green discoloration to the  
20 whites of the eyes, things of that nature.

21       Q. How would nitrosamine poisoning manifest itself  
22 in a pregnant mink?

23       A. I would expect that it would manifest itself in a  
24 similar way to what has been described in mice and in  
25 rats with some other nitrosamines in that you'll see a

1 decrease in birth weights, you'll see a decrease in  
2 viable offspring, in other words, you'll have some  
3 stillbirths and a decrease in the viability of the  
4 offspring that are born live.

5 Q. What is your understanding of the symptoms  
6 exhibited by the Jonssons' mink after they began  
7 consuming the lactation crumlets?

8 A. As it was described to me, the mink began  
9 exhibiting signs of some reluctance to eat the feed, not  
10 necessarily complete anorexia, but some reluctance to  
11 eat the feed, which was described to me as not being  
12 unusual at the time of the mink having kits. It wasn't  
13 unusual for mink to back away from feed a little bit,  
14 you know, the day before or the day that they have their  
15 kits, but usually they come right back on to feed is the  
16 way it was described to me. But these mink did not tend  
17 to come back on to feed as they normally would, that  
18 they had an abnormally large number of kits that were  
19 born dead or died within a few days of birth was the  
20 predominant manifestation that was described to me.

21 Q. You mentioned that you reviewed a lot of  
22 information while you performed your analysis of this  
23 case, correct?

24 A. Yes, sir.

25 Q. Have you come across any information, Dr. Hall,



1 that would lead you to believe that disease played any  
2 part in the death of the Jonssons' mink in 2010?

3 A. No, sir, I have not.

4 Q. Are you familiar with a compound known as  
5 histamine?

6 A. Yes, sir, I am.

7 Q. What is histamine?

8 A. Histamine is basically a nitrogenous molecular  
9 substance that has a wide variety of effects on a body  
10 or tissues. It can affect a lot of different organ  
11 symptoms.

12 Q. What effect does histamine have on mink?

13 A. Histamine has been studied in mink, it is known  
14 that it can affect their food intake, it can cause them  
15 to have digestive disturbances, they can have vomiting  
16 and diarrhea, they can have decreased weight gain, they  
17 can have decreased feed efficiency, they can actually  
18 have some damage to the lining of the digestive tract  
19 where they end up with swollen stomachs.

20 Q. At what concentration can histamine be toxic to a  
21 mink?

22 A. The predominant study that I utilized I believe  
23 the lowest concentration they fed was 110 or 118 parts  
24 per million in the final diet. They did have adverse  
25 effects. That was actually the lowest amount that they

1 fed. But in that same paper they referenced other -- a  
2 study article saying that concentrations of above 50  
3 parts per million has been reported to be -- to  
4 potentially cause adverse effects.

5 Q. What concentration of histamine would be toxic to  
6 a pregnant mink?

7 A. That's a difficult question because the true  
8 answer is we don't know. I've never seen any studies  
9 where they actually dosed histamine to pregnant mink to  
10 look at the effect. Looking at a variety of other  
11 studies, it is known that at least in some species  
12 during pregnancy there are enzymes that help break down  
13 histamines where it may not be as much of a problem.  
14 But that effect in mink is not known.

15 THE COURT: Are you about through with him,  
16 counselor?

17 MR. HANCEY: I'm sorry?

18 THE COURT: Have you got a few more minutes  
19 with him?

20 MR. HANCEY: I do, Your Honor, and this  
21 might be a good point to break.

22 THE COURT: Why don't we give these folks a  
23 15-minute break. Remember what I told you. Let's be in  
24 recess for 15 minutes. Quarter to.

25 MR. HANCEY: Thank you.

1 (Recess.)

2 THE CLERK: Court resumes session.

3 THE COURT: We're all here, and you go  
4 ahead, counselor. Let's bring in the jury.

5 (Jury present in open court.)

6 THE COURT: Again, thanks, folks, sit down,  
7 relax.

8 Let's continue, counselor.

9 MR. HANCEY: Thank you, Your Honor.

10 Q. (By Mr. Hancey) Okay. Dr. Hall, when we left off  
11 we were talking about histamine. Let me direct your  
12 attention, sir, to Exhibit 17, and specifically the  
13 third page in that exhibit, and the number down at the  
14 bottom is 1120. Are you with me?

15 A. Yes, sir, I am.

16 Q. Have you seen that document before?

17 A. Yes, sir, I have.

18 Q. Is that something that you've relied on in this  
19 case?

20 A. Yes, sir.

21 Q. Now, let me just keep your finger there and turn  
22 over to tab 18 and look at the first page of that  
23 exhibit, number 1116, do you recognize that document?

24 A. Yes, sir.

25 Q. Is that something that you've relied on in this

1 case?

2 A. Yes, sir.

3 Q. What do these two lab reports, Dr. Hall, one from  
4 Surefish and one from eurofins, a different lab, tell  
5 you about this case?

6 A. Both of them had concentrations of histamine that  
7 were high. The lactation crumlets, 25 percent fish meal  
8 in the Surefish analytical testing sample was 442.2  
9 parts per million, which is the same thing as 442.2  
10 milligrams per kilogram of feed. The other sample on  
11 the eurofin certificate of analysis was histamine at 206  
12 micrograms per gram. And micrograms per gram is the  
13 same thing as milligrams per kilogram, which is the same  
14 thing as parts per million. So one of the reports had  
15 442.2 and the other report had 206.

16 Q. Are the numbers in these lab reports  
17 representative, Dr. Hall, of the histamine  
18 concentrations that were actually consumed by the  
19 plaintiffs' mink?

20 A. Actually there's no way to know for sure, but  
21 they are likely less than what was present at the time  
22 of food consumption.

23 Q. Are you saying that the concentrations of  
24 histamine in the feed -- in the crumlets at the time of  
25 feeding was less than what we're seeing in these test

1 results some months later?

2 A. I'm saying that there is the potential for them  
3 to be less. There was actually a number of different  
4 tests, and concentrations were, I guess a good way to  
5 describe it, all over the board, ranging from fairly low  
6 concentrations to fairly high concentrations. The  
7 concentrations in each of those samples tested were all  
8 likely higher at the time that the feed was manufactured  
9 than they were at the date of testing.

10 Q. Why is that?

11 A. Because most of the histamine that's produced in  
12 fish is produced from histidine, an amino acid. That  
13 histidine conversion to histamine occurs fairly readily.  
14 That's one of the reasons fish are preserved fairly  
15 quickly after harvest, either put on ice or treated with  
16 some type of preserving agent to prevent the degradation  
17 of the fish tissue. During that degradation process is  
18 when you get that histamine production. A number of  
19 studies have been done that looked at histamine  
20 concentrations across time and found that at a variety  
21 of temperatures, at a variety of humidity conditions,  
22 that the histamine significantly drops across time.

23 Q. Can you say with a degree of scientific certainty  
24 whether or not the histamine concentrations in the  
25 lactation crumlets at the time the Jonssons' mink were

1 fed were at toxic levels?

2 A. Because of the high variability, there is, with a  
3 reasonable degree of scientific certainty, at least some  
4 of the bags that contained histamine concentrations at  
5 toxic concentrations.

6 Q. At the time of feeding?

7 A. At the time of feeding.

8 Q. What significance, if any, do you place on the  
9 fact that there were histamine concentrations found in  
10 some of these lab reports that you described as being  
11 all over the map?

12 A. I've seen that in a number of cases I've been  
13 involved with around the country. One example that I  
14 had on a case in Virginia there was a feed mixing error.  
15 In that particular case there was an ionophore feed  
16 additive in a horse feed which was toxic. We tested --  
17 I think when we finish tested we tested 28 separate bags  
18 from one production lot, and we had concentrations that  
19 ranged from zero to concentrations up as high as 1800  
20 milligrams per kilogram of feed just because the feed  
21 was not uniformly mixed. It came all out of the same  
22 batch, but there was some disparity within that batch  
23 because it was not completely homogenous.

24 Q. How would histamine poisoning manifest itself  
25 clinically in a mink?

1       A. It can cause some gastric irritation. It has the  
2 potential of causing some vomiting and diarrhea at --  
3 even in concentrations that are high that cause vomiting  
4 and diarrhea in some studies it's reported that over  
5 time the animals acclimate to it, they still have the  
6 potential of a loose stool, even though it may not be  
7 complete profuse watery diarrhea, but the stool may  
8 still be loose and they still have the potential of  
9 causing decreased feed intake, decreased feed  
10 efficiency, decreased gain, the animals don't grow as  
11 fast, and they can have some lesions in the stomach as  
12 well.

13       Q. What symptoms would we find for histamine  
14 poisoning in pregnant mink?

15       A. The potential is that animals that have gastric  
16 distress don't eat as much. Animals that are pregnant  
17 have a higher metabolic demand, and so if animals are  
18 forced to restrain from eating during a time of high  
19 metabolic demand, it can put them into a negative energy  
20 situation to where they may not have appropriate body  
21 nutrients to adequately supply the fetus to adequately  
22 produce milk after having the kits to provide for kit  
23 survival. Because there is minimal, very, very minimal  
24 data on histamine and pregnancy, it becomes a very  
25 difficult question to answer and you have to -- you have

1 to answer it knowing what histamine causes in a  
2 nonpregnant animal and use some degree of scientific  
3 reason from that point.

4 Q. Is that something that's acceptable in your -- in  
5 what you do?

6 A. In many cases you have to extrapolate because  
7 there may not be studies done in the individual species  
8 or at the individual age or at the individual subset  
9 population for every compound, and so there are times  
10 that you have to extrapolate between species the same  
11 way as you do when you extrapolate from animal studies  
12 to humans. At human poison control centers, obviously  
13 you're not going to dose people to determine how you  
14 want to treat a poison. You have to do it based on what  
15 we know in animals, and you have to do that same  
16 extrapolation between animal species.

17 Q. Now, you testified earlier, Dr. Hall, that it was  
18 your scientific opinion that nitrosamines have a  
19 neonatal -- or are toxic to the offspring or to the  
20 young of adult animals, including mink; is that a far  
21 characterization? I think you said it was neotoxic to  
22 mink.

23 A. It is neotoxic to mice.

24 Q. To mice. And you used extrapolation to bring  
25 those studies over into the realm of mink; is that



1 correct?

2 A. That is correct.

3 Q. Now, the Jonssons testified earlier in this trial  
4 that in 2010 they also lost about 400 adult mink. Do  
5 you have an opinion on how nitrosamines could have  
6 impacted the adult mink, or the adult pregnant mink that  
7 consumed the lactation crumlets during that period of  
8 time?

9 A. The concentrations of nitrosamine would not have  
10 been high enough to where I would have expected to see a  
11 direct effect of the nitrosamines causing mortality in  
12 the mothers. The concentrations to where that does  
13 happen on an acute basis are much higher than what we've  
14 identified in this particular case. However, because it  
15 has the potential, based on my studies and based on  
16 things that have been seen in rats and other species  
17 associated with decreased offspring survival and the  
18 production of stillbirths, if an animal had stillbirths  
19 or had a fetus that had died that, for example, got  
20 retained within the uterus, then you can see  
21 complications from the dead fetus beyond the dead fetus  
22 itself if it's not properly expelled, and sometimes that  
23 occurs.

24 Q. Do you have an opinion on whether or not the  
25 Jonssons could expect to see continued health effects in

1 their mink heard at the Lehi Ranch following the 2010  
2 calendar year?

3 A. There is a potential yes, sir.

4 Q. Based on what?

5 A. In studies at lower concentrations very  
6 long-term, in fact -- I can't quote it directly, but  
7 this is close, they stated that mink provided  
8 nitrosamines for a long enough duration there's the  
9 potential for production of cancers in 100 percent of  
10 the animals. Now, in this particular situation, the  
11 contaminated lactation crumlets were fed for a window of  
12 time, not continuously. You have the potential, even  
13 with the window of time exposure, when you're dealing  
14 with a cancer producing agent to cause DNA damage that  
15 can result in those animals developing tumors months or  
16 even a year after the fact. So, yes, there is the  
17 potential.

18 Q. Now, we have discussed nitrosamines and we've  
19 discussed histamines. Is there anything else you  
20 considered, Dr. Hall, in formulating your opinions in  
21 this case?

22 A. In evaluating a case of this nature you have to  
23 evaluate everything, you know, not just individual  
24 compounds. There were a number of things that were  
25 brought to my attention that were initially thought to

1 be issues with the mink. There was investigations done  
2 along the lines of ionophores in the feed, and I quickly  
3 instructed the Jonssons and the Griffeths both that  
4 that, at the concentrations that were identified, was  
5 not a problem. You know, it was obviously a low enough  
6 concentration that it was of no concern whatsoever to  
7 me. There was discussion of vitamin E deficiencies  
8 potentially being a problem. The indications were,  
9 based on feed testing and things of that nature, that  
10 there was adequate vitamin E in the feed, that some of  
11 the animals that tested, the low vitamin E may have been  
12 secondary to something else causing the vitamin E to go  
13 away, which you can see with oxidative stress and  
14 diseases, chemical reactions, things of that nature.

15 The key that I kept coming back to, there  
16 has been some suggestion of infectious ideologies, and  
17 for various reasons those infectious ideologies were in  
18 my mind ruled out based on circumstances and facts  
19 associated with the case. And so I look at that in a  
20 broad umbrella in order to focus myself down to a final  
21 diagnosis and final conclusion.

22 One of the key things for me comes back to  
23 what I described early on. This was a very nice case  
24 control study where we have four separate locations,  
25 three of which received the feed in question and one of

1    which did not. The three locations that received the  
2    feed in question had what was described to me as almost  
3    identical clinical manifestations within the animals.  
4    As it was described to me, two of the locations -- or  
5    one of the locations had a slightly higher mortality.  
6    That same location was one that include the crumlets at  
7    a higher rate of inclusion. And so in some ways looking  
8    at that it was almost like a dosed case controlled study  
9    as well. The one location where the feed was not fed,  
10   there was not the problem. That points to the feed as  
11   being a causative source.

12                   There was indication of infectious  
13   ideologies potentially being a problem. For various  
14   reasons I ruled that out.

15       Q. By that you mean disease?

16       A. Correct.

17       Q. Okay.

18       A. There were some animals that had tested positive  
19   for Aleutian disease on the Jonssons' ranch. Actually  
20   that didn't surprise me because I was told upfront that  
21   Aleutian disease was endemic on that ranch.

22   Interestingly enough, at the location of Mr. Griffeth  
23   his mink were Aleutian disease free and they showed the  
24   same clinical signs. So if you see a population where  
25   everything's showing the same signs and one group has X

1 and one group doesn't have X, then X is likely not the  
2 cause in all locations.

3 The thing that was common in all locations  
4 was the lactation crumlets. We identified toxic  
5 concentrations of histamines and nitrosamines in those  
6 lactation crumlets, and so that's what narrowed the  
7 field.

8 Q. What is your understanding of the husbandry, or  
9 the ranching practices that exist among the Jonssons'  
10 two ranches?

11 A. I am not a mink ranching expert. I have been on  
12 a mink ranch once in my life, and so my understanding is  
13 there was no indication they were outside of an industry  
14 norm, at least nothing that I read in any of the  
15 depositions and anything else indicated that they were  
16 outside of the industry norm.

17 Q. Dr. Hall, can you summarize your findings and  
18 opinion in this case for the jury.

19 A. Based on the evaluation of the data provided to  
20 me, on the scientific literature, the research, and the  
21 analytical testing that I've evaluated, it is my  
22 professional opinion, within a reasonable degree of  
23 scientific certainty, that the lactation crumlets was  
24 the causative entity associated with the increased  
25 neonatal mortalities that occurred in the May-June time

1 period 2010 at the Jonssons' ranch.

2 Q. What about the mink that died on the Jonsson  
3 ranch later in the year?

4 A. Any time you have a ranch operation where you  
5 have thousands of animals you're going to have deaths.  
6 Being able to attribute it back to the original feed is  
7 very difficult because you're going to have natural  
8 disease entities that occur. Is it possible that some  
9 of those animals had tumors and died and they weren't  
10 identified? Yes, it's possible. But to what degree I  
11 cannot, with a reasonable degree of scientific  
12 certainty, say.

13 MR. HANCEY: No further questions, Your  
14 Honor.

15 MR. MINNOCK: Thank you, Your Honor. It's  
16 just going to take me a minute. I need my board again,  
17 of course.

18 THE WITNESS: I like using a board.

19 **CROSS-EXAMINATION**

20 **BY MR. MINNOCK:**

21 Q. You know, I talked with Mr. Mitchell at the  
22 break, and you caught a break, Dr. Hall, that I'm going  
23 to let him talk to you about the numbers because the  
24 concentration numbers and stuff he has a far better  
25 understanding of that, so you won't have to educate me

1 on that.

2 Okay. When you get an assignment like this  
3 in your profession you generally look at three different  
4 things, and those are the clinical data, the  
5 histological results, and then the feed tests, right?

6 A. Actually, I personally, when I investigate a case  
7 like this, I look at a lot more than that.

8 Q. Well, I know you do, but those are the three  
9 broad characterizations that you look at. You added  
10 scientific literature and then you look at -- but you  
11 look at a lot of things, right?

12 A. I look at a lot of things. I also do interviews  
13 with the parties involved to try to get all the facts  
14 possible.

15 Q. Now, in this case, all of the data that you have  
16 regarding the symptoms and events that were going on on  
17 those ranches come from the parties themselves, right,  
18 Mr. Jonsson --

19 A. Yes.

20 Q. -- and Mr. Griffeth?

21 A. That is correct.

22 Q. All right. But you don't have any data from any  
23 veterinarian.

24 A. No, sir.

25 Q. Because no veterinarian was ever called, right?

1           A.    That is my understanding.

2           Q.    And when I -- and if this was you and you were  
3 suffering this kind of loss, you would have counseled  
4 them to call a veterinarian, correct?

5           A.    Had they called me early on that would have been  
6 my recommendation.

7           Q.    And had they called you, what you would have done  
8 is you would have examined these mink yourself as an  
9 expert to determine what the symptoms and signs that  
10 they were exhibiting were.

11          A.    That is correct.

12          Q.    And you would have done necropsies on the  
13 deceased mink to determine whether the disease profile  
14 fit what you were seeing on the farm.

15          A.    That is correct.

16          Q.    Okay. But none of that occurred.

17          A.    That is correct.

18          Q.    Now, you talked about what you called a control,  
19 and let's make sure we understand what we mean by a  
20 control. A control means that you have everything  
21 essentially identical, but you change one variable to  
22 determine whether or not it affects the outcome; is that  
23 fair to say?

24          A.    That is the most theoretically pure control.

25          Q.    Okay. And I understand that's very difficult to



1 obtain, either scientifically or in the field or  
2 anything, but that's sort of what you're trying to do is  
3 search for commonality and then separate out one  
4 particular variable, right?

5 A. That is correct.

6 Q. Okay. Now, here you said that the control, I  
7 take it, would be in your mind the Cedar Valley Ranch,  
8 right?

9 A. That is correct.

10 Q. And the other four would be -- or the other three  
11 that you would be talking about would be Roger Griffeth,  
12 Kent Griffeth, and the Jonssons' Lehi farm, right?

13 A. That is correct.

14 Q. Okay. All of which claim losses against National  
15 Feeds, right?

16 A. Yes.

17 Q. Okay. In your investigation you were given a  
18 copy of the deposition of Scott Harris, right?

19 A. I recognize that name, yes, sir.

20 Q. And Scott Harris also received the lactation  
21 crumlets from the identical batch as the Griffeths and  
22 the Jonssons, right?

23 A. If -- I do not recollect seeing a deposition from  
24 somebody else that received the lactation crumlets.

25 Q. Well, it was Mr. Harris who was in this group.

1 Do you remember reading his deposition where he said he  
2 suffered no adverse losses in 2010?

3 A. Actually I'm not sure that I read that  
4 deposition, I have to go back and check, because I do  
5 not recollect reading any deposition where somebody said  
6 they did not see any losses.

7 Q. But it would obviously be an important  
8 consideration to take into account whether or not  
9 somebody else who was not a party to this litigation or  
10 to other litigation suffered a similar loss, right?

11 A. That would be important to me, yes.

12 Q. All right. Now, the other thing is when you  
13 talked about your control, there's no documentation that  
14 supports -- that you've been able to see that supports  
15 what they've told you in terms of the fact that the  
16 Cedar Valley farm suffered no losses and Lehi did,  
17 right?

18 A. I'm not saying they didn't suffer any losses.  
19 You always have a small number of losses any time you  
20 have a production environment.

21 Q. Well, I guess I should have stated it to you this  
22 way: You haven't seen any documentation regarding the  
23 production on the Lehi farm versus the Cedar Valley farm  
24 to determine whether or not your control -- the data  
25 meshed with your control.

1       A. That is correct. I took that from the  
2 information that was provided to me.

3       Q. All right. And you understood that on the Lehi  
4 Ranch -- well, you understood that with respect to  
5 mahoganies, okay, that we don't know whether any  
6 particular mahogany owned by the Jonssons ate the  
7 lactation crumlets or not, right, because they had half  
8 in Lehi and half in Cedar Valley, right?

9       A. Okay. You lost me in the middle of that  
10 somewhere in the description.

11       Q. Was it your understanding that the Jonssons kept  
12 half their mahoganies in Lehi and half their -- well,  
13 it's actually more than half their mahoganies in Cedar  
14 Valley?

15       A. My understanding was they were split, I didn't  
16 know to what ratio.

17       Q. But you understood they were split.

18       A. Yes.

19       Q. You understood also that they kept all of their  
20 blacks in Lehi.

21       A. I was told that, yes.

22       Q. So if you wanted to determine whether or not  
23 there was -- your control experiment was correct you  
24 would look at the production values on the black mink  
25 because you know that they ate the lactation crumlets,

1 right?

2 A. Yes.

3 Q. And if the production for black mink actually  
4 rose the year that the Jonssons fed the lactation  
5 crumlets as opposed to falling, that would cause you  
6 some concern about your opinions and about your control.

7 A. I would want to look and make sure numbers were  
8 equal year to year to see whether it truly rose or  
9 whether they had an increased number of females to where  
10 they had a higher number of babies. If it truly did  
11 rise, then, yes, that would concern me.

12 Q. Okay. All right. Well, we've seen this chart,  
13 and I'm not trying to hide it from you, but our jury's  
14 seen it a million times, and we'll deal with that issue  
15 later. I know we're short on time here today.

16 Okay. Now, let's talk about some nitrosamines.  
17 The reason that you pointed to the one nitrosamine  
18 sample that had .22 of the NDMA, which is the -- I can  
19 never pronounce it, but you referenced it, the  
20 dimethylamine, the reason you relied on that as the most  
21 credible is because you oversaw that sampling yourself.

22 A. I actually opened the bag and took the sample  
23 myself.

24 Q. All right. But, nevertheless, you're not able to  
25 extrapolate that level back to when the mink actually

1 ate the feed.

2 A. I cannot extrapolate it, but with a reasonable  
3 degree of scientific certainty I can say it should be  
4 similar, if not equal, to the concentrations that were  
5 present at the time that they were fed.

6 Q. Let me show your deposition because I asked you  
7 that question in your deposition. Let me hand you that.  
8 If you'll turn to page 52, line 22, to 53, line 6, and I  
9 think I asked you the question. Okay. All right. Have  
10 you done any -- made any determination as to what the  
11 rates of these nitrosamines would be back when it was  
12 being fed in March, April, May of 2010, some, what is  
13 that, 18 months earlier than when you did your  
14 sub-sample?

15 Without having data from that exact time  
16 point you can't make an extrapolation.

17 My question was, If you can't make an  
18 extrapolation, could that be as low as zero at that  
19 point?

20 And you said, It's possible.

21 A. It is possible.

22 Q. Okay. All right. Now, let's talk a little bit  
23 about dose, because you talked about that term with  
24 Mr. Hancey, dose versus concentration. The testing  
25 results that you went through with Mr. Hancey are the

1 concentrations in the feed, right?

2 A. That is correct.

3 Q. Okay. So that would be similar to me if I pick  
4 up a bottle of Tylenol and it says 500 milligrams.

5 A. That is correct.

6 Q. Each one of those pills has 500 milligrams.

7 A. That is correct.

8 Q. Okay. What's the difference between that and  
9 dose?

10 A. A dose is taking the concentration in a feed, for  
11 example, multiplying it by the amount of feed that was  
12 ingested, and then dividing it by the body weight of the  
13 animal to get an actual number of milligrams per  
14 kilogram of an individual compound that was ingested on  
15 a daily, weekly, monthly, or lifetime basis.

16 Q. And that's how you take into account the fact  
17 that I can take 500 milligrams of Tylenol but my 7 year  
18 old can't take 500 milligrams of Tylenol.

19 A. That is correct.

20 Q. Because even though it's the same concentration,  
21 it would be more harmful to him because of his smaller  
22 body weight, right?

23 A. Extremely higher dose.

24 Q. Extremely higher dose because of his smaller body  
25 weight.

1 A. Correct.

2 Q. Okay. What I want to understand is what do you  
3 believe could be the dose of NDMA per day per mink given  
4 the .22.

5 A. When you calculate the dilution ratios on a  
6 dry-weight basis, you are looking at approximately  
7 0.1. Not 0.01. You've got your point in the wrong  
8 place.

9 Q. Oh, 0.1?

10 A. Milligrams per kilogram of feed.

11 Q. Now, that's our concentration.

12 A. Right.

13 Q. Okay. What's our dose?

14 A. Okay. If you have a 1 kilogram mink and they're  
15 eating 10 percent of their body weight, then you have --  
16 so --

17 Q. Hans, where is your calculator?

18 A. You end up with an exposure of 0.01 milligram per  
19 kilogram per day.

20 Q. 0.01.

21 A. Right.

22 Q. Milligram per kilogram of body weight, BW.

23 A. Per day.

24 Q. Per day. Per day. Okay. And then if you want  
25 the total exposure you times this by the number of days

1     that they consume the feed.

2           A.    That's correct.

3           Q.    All right.  Do you take into factor any  
4     elimination?

5           A.    Actually what you're doing there is you're  
6     calculating total exposure, and total exposure may or  
7     may not have any validity on whether they have a toxic  
8     reaction or not.  It may be the individual time point of  
9     exposure.

10          Q.    All right.  Now, let's talk then about the  
11     histamines.  What did you -- what is your calculation of  
12     the dose of histamines that you believe these mink  
13     ingested?

14          A.    I did not calculate dose of histamines.  On the  
15     studies within NDMA, the studies that I was comparing to  
16     was comparing against dose.  So the studies with the  
17     histamine I was comparing to studies that were based on  
18     concentration in the feed.

19          Q.    So we don't have a dose on histamines.

20          A.    I did not calculate a dose on histamines, no,  
21     sir.

22          Q.    Now, you went through with Mr. Hancey some  
23     discussion about the -- let me move this out of the way  
24     so we can see each other.  I apologize.  You went  
25     through with Mr. Hancey the fact that there was a



1 variability in the histamine testing over time, right?

2 A. That is correct.

3 Q. Okay. And you posited that one potential cause  
4 of that may be either incomplete or uneven mixing of the  
5 feed.

6 A. That is correct.

7 Q. Okay. Another possibility could be that the test  
8 samples were not done properly.

9 A. That's a possibility as well.

10 Q. And, in fact, the first test that was ever done  
11 for histamines did you ever see that test, Exhibit  
12 Number 40, if you want to look in that book at Exhibit  
13 Number 40?

14 A. I've actually seen pages and pages and pages  
15 worth of testing, so let me look to make sure I've seen  
16 this specific one. You said Exhibit 40, sir?

17 Q. Yes, Exhibit 40. It's the first test that was  
18 done in December of 2010, and it indicated that  
19 histamines were in fact not detected, right?

20 A. That is what the report says, yes, sir.

21 Q. All right. And that was the only test that was  
22 done prior to litigation being filed in this case.

23 A. I'll take your word for that. Like I say, I've  
24 looked a lot of tests with a lot of dates on them.

25 Q. With the nitrosamines you sent out a test of your

1 own to make sure that it would be accurate, but you did  
2 not do a similar thing with respect to the histamines.

3 A. That is correct.

4 Q. Okay. You said -- you were asked a question by  
5 Mr. Hancey, and this is my final question, then I'll let  
6 Mr. Mitchell ask you some questions, that when you  
7 talked about the potential future a year from then that  
8 in mink that had been given long-term doses of  
9 nitrosamines that they in fact had developed tumors in  
10 some of these studies.

11 A. That is correct.

12 Q. Okay. Those were over a period of almost  
13 500 days. The one study you were talking about, which I  
14 think is the Koppang article, they were exposed to a  
15 dose for 500 days before they developed --

16 A. Some animals were, some animals developed tumors  
17 prior to that time point.

18 Q. Here we're talking about a period of about  
19 40 days, right?

20 A. That's correct.

21 Q. None of the data that you've seen from any  
22 necropsies show any tumors.

23 A. I have not seen any necropsy data with tumor  
24 information on it, no, sir.

25 Q. Okay. So at this point you cannot say that there

1 were any losses in 2011 or beyond that would be  
2 attributable to the ingestion of the lactation crumlets.

3 A. All I said was that it was possible.

4 Q. Right. But you're not willing to say that that  
5 is probable to a degree of scientific certainty.

6 A. I have not seen any data to support it, no, sir.

7 MR. MINNOCK: All right. Thank you very  
8 much.

9 **CROSS-EXAMINATION**

10 **BY MR. MITCHELL:**

11 Q. Dr. Hall, you haven't done anything to actually  
12 confirm that the Jonssons suffered an increased neonatal  
13 mortality rate in 2010, did you?

14 A. I took that information directly from them. I  
15 did not go visit the farm, no, sir.

16 Q. Didn't go visit the farm, you didn't look at any  
17 of their production records, anything like that that you  
18 could use to verify whether they actually suffered an  
19 increased death rate.

20 A. I did not do an economic analysis in this  
21 situation, no, sir.

22 Q. Okay. I think you've also mentioned really a  
23 number of things that are associated with both  
24 nitrosamines and histamines. For example, you've  
25 mentioned at the acutely high doses you can see liver

1 failure and jaundice of the eyes, things like that, and  
2 we haven't seen any of that in this case, correct?

3 A. And I wouldn't. No, sir, we haven't.

4 Q. Okay. And now have we seen anything that falls  
5 into the lower range of exposure that you discussed, for  
6 example, a reluctance to eat food?

7 A. The concentrations that were determined were not  
8 concentrations that previously had been reported to  
9 cause them to back away from feed.

10 Q. So you wouldn't have associated any backing away  
11 from feed with levels of nitrosamines that may or may  
12 not have been present in the feed in 2010.

13 A. If these were nonpregnant mink I could make that  
14 statement based on the science that's been done to date,  
15 but since those studies have not been done adequately in  
16 mink that are pregnant, I cannot say one way or the  
17 other.

18 Q. Okay.

19 THE COURT: You might pull that mic a little  
20 towards you to make sure everybody hears you.

21 THE WITNESS: I'm sorry.

22 Q. (By Mr. Mitchell) Were you provided with the feed  
23 data from the Jonssons for -- say, for example, the year  
24 2010?

25 A. What do you mean by the feed data?

1 Q. Well, you understand that they received periodic  
2 deliveries of feed from the Fur Breeders Ag Co-op,  
3 correct?

4 A. That is correct.

5 Q. Now, did they share with you the quantities of  
6 feed that they had delivered and fed their mink in the  
7 time period say April, May, and June of 2010?

8 A. I do not remember seeing delivery records.

9 Q. Okay. And so you wouldn't have seen delivery  
10 records then for 2009 either, correct?

11 A. I do not believe so, sir.

12 Q. So at that point, you wouldn't be aware, for  
13 example, that they actually consumed more feed during  
14 that period in 2010 than they did in 2009.

15 A. I do not have that data, no, sir.

16 Q. Okay. Let's see, you've already talked about  
17 tumors, so I won't touch on that.

18 Were you provided with any data about birth  
19 weights for the kits?

20 A. My understanding was they tried to leave the kits  
21 alone when they were born because you most times don't  
22 want to disturb very young neonates because sometimes  
23 that can cause the mothers to abandon them.

24 Q. So your answer is no.

25 A. The answer is no.

1 Q. Okay. You mentioned in moderate doses that we  
2 can see liver damage and fibrosis in the liver as well,  
3 and we haven't seen any necropsies with liver damage or  
4 fibrosis, correct?

5 A. Correct.

6 Q. Okay. Now, in histamines, there seems to be some  
7 overlap in potential signs that one could see with  
8 nitrosamines and then some that didn't necessarily  
9 overlap. You mentioned the potential for a decreased  
10 food intake, and we've already gone over the fact that  
11 you weren't given any data on food intake.

12 Vomiting, you mentioned that there's the  
13 potential for vomiting. And you received Keith  
14 Jonsson's deposition and Michael Jonsson's deposition,  
15 correct?

16 A. That's correct.

17 Q. And you've looked at both of those depositions?

18 A. Yes, sir.

19 Q. That was part of your investigation?

20 A. Yes, sir.

21 Q. And you're aware that they've testified that they  
22 didn't see any vomiting?

23 A. Yes, sir.

24 Q. And the same is true for diarrhea.

25 A. That is true.

1 Q. Okay. Now, another symptom that you are -- it's  
2 really more of a sign that you mentioned is possible to  
3 see in a histamine poisoning setting is a swollen  
4 stomach, they can get bloated. Distended stomachs.

5 A. They can get distended stomachs. It never has  
6 been truly described as a bloat, it's just the stomach  
7 is enlarged when the animals were killed and the  
8 stomachs taken out.

9 Q. Okay.

10 A. It was not described as a bloat.

11 Q. An enlarged stomach or a distended stomach is the  
12 way you would describe it.

13 A. Yes.

14 Q. So we haven't seen any necropsies with either  
15 enlarged or distended stomachs.

16 A. To my understanding there was no necropsies done  
17 for an extended period of time after the feed was  
18 stopped. But, no, I have not seen any necropsies with  
19 those results.

20 Q. And since you looked at Keith Jonsson's  
21 deposition you're also aware of the fact that when Keith  
22 Jonsson cut open some of the mink on his ranch that he  
23 didn't see any distended stomach either.

24 A. That was not described, that's correct.

25 Q. Right. He --

1       A. I don't remember that that question was ever  
2 asked specifically did he see that, but I -- that was  
3 not something he described.

4       Q. Okay. So let's take a look then at some numbers.  
5 Now, how much -- what is your going rate as an expert in  
6 this case?

7       A. My charge is \$200 an hour.

8       Q. Okay. Before we get going on that, you went  
9 through a fairly impressive recitation of the things  
10 that you've done throughout your career. In looking at  
11 your CV and then listening to your recitation, I didn't  
12 hear where you've, for example, actually engaged any  
13 research projects with regard to nitrosamines outside of  
14 this case.

15       A. Not with respect to nitrosamines, but with in  
16 respect to cancer compounds, yes, I have.

17       Q. Okay. But nothing to do with nitrosamines  
18 outside this case.

19       A. That's correct.

20       Q. So that would be true that you haven't published  
21 any papers with regard to nitrosamines.

22       A. That is correct.

23       Q. Okay. And the same is true for histamines as  
24 well, correct?

25       A. That is correct.



1 Q. No papers and no research outside this case.

2 A. Correct, sir.

3 Q. Okay. Now, you did mention when you got going  
4 that it's important to look at the facts that are  
5 presented to you. Now, somebody who's going through and  
6 doing an investigation to reach some conclusions you  
7 want to take a look at all of those facts and you want  
8 to have all of those facts presented to you so you can  
9 incorporate all of them into your analysis and come to a  
10 sound conclusion, correct?

11 A. That is correct.

12 Q. Okay. So you've talked about how you've gone  
13 about and done some calculations, and you mentioned that  
14 you -- the Jonssons told you that they tried to get an  
15 incorporation rate, I think you said, of 20 percent.

16 A. 20 to 25 percent.

17 Q. 20 to 25 percent. So now you've had Keith  
18 Jonsson's deposition, like we've talked about, and so  
19 you would have gone through then and looked at the way  
20 that they actually incorporated the feed, the lactation  
21 crumlets into the wet feed, to make sure that they  
22 actually reached a 20 percent inclusion rate, didn't  
23 you?

24 A. I remember reading those documents. I did not  
25 sit down and do the calculations at that point. I had

1 already been told that they were including it at  
2 approximately 20 to 25 percent.

3 Q. Okay. So let's go through and do those  
4 calculations then. As you've -- you've sent out a  
5 revised report, or a supplemental report, late November  
6 of last year. I think you've kind of referenced it  
7 where you received some additional information  
8 concerning the moisture levels in the co-op feed and so  
9 you kind of incorporated that into your analysis and you  
10 went through and issued this initial report -- or, I'm  
11 sorry, this supplemental report. And so if we look at  
12 what the Jonssons actually did, how they describe the  
13 process of mixing the feed, you understand, don't you,  
14 that they were mixing up about 750-pound batches of feed  
15 at a time?

16 A. In that general neighborhood. I think at one  
17 time they described to me as mixing up between 650 and  
18 700 pounds, at one time they said something close to 700  
19 pounds, so in that general vicinity.

20 Q. Let's assume that they've testified before you  
21 and that they've testified that it's been between  
22 somewhere around 750 to 760 pounds for each batch of  
23 feed that they mix up, okay?

24 A. Okay.

25 Q. Okay. So for a little bit easier number say,

1 we'll deal with a 750-pound batch. Now, is it your  
2 understanding then that for each 750-pound batch they go  
3 through and add in 100 pounds of lactation crumlets?

4 A. That was my understanding.

5 Q. Okay. So out of this 750-pound batch we've got  
6 100 pounds of lactation crumlets, and if we do the math  
7 that -- and I'm happy to give you a calculator because I  
8 don't want you to take my word for it, but it ends up  
9 being about 13.3 percent.

10 A. Of total weight, not of dry matter intake.

11 Q. We haven't moved on to dry matter yet. I'm  
12 starting where you started. I'm starting where you  
13 started in your report. You assumed a 20 percent or  
14 25 percent inclusion weight by -- inclusion rate by  
15 weight, correct?

16 A. Right.

17 Q. Okay. So if we assume 100 pounds in a 750-pound  
18 batch it works out to about 13.3 percent.

19 A. Actually when I did it originally, my  
20 understanding was there was over 100 pounds of water  
21 added to that. I did not account for that water because  
22 the water was to be taken out, and so my original  
23 calculations did not include any of that water either.  
24 The numbers are not the 650 pounds, no.

25 Q. The 750 pounds is the total batch, which includes

1 wet feed, water, and lactation crumlets.

2 A. And I did not include the 100 pounds of  
3 additional water that they added, which is something  
4 that I had been told.

5 Q. Let's make sure we're on the same page.  
6 750 pounds total mixed ration.

7 A. Total mixed ration, yes, sir.

8 Q. Which includes wet feed from the co-op.

9 A. Okay. When I was originally described this it  
10 was not described to me as wet feed. It was described  
11 as co-op feed. So I assumed it was a dry feed, the same  
12 as the lactation crumlets. So I ignored the 100 pounds  
13 of water and only included the co-op portion, the feed,  
14 thought to be a dry-weight feed, and the crumlet feed  
15 when I did my original calculations.

16 Q. I understand. But what we're talking about here  
17 is 100 pounds out of a 750-pound batch, 13 percent and  
18 change, okay? That's just the starting inclusion rate  
19 for the lactation crumlets for purposes of the  
20 calculations that we're going to do, okay?

21 A. Okay. We'll go with your math.

22 Q. Okay. Well, it's your math as well. We've -- we  
23 can mark in your report, but that's the starting point.

24 A. If you include the -- and like I say, in my  
25 original math and in my original description I did not

1 include that 100 pounds of water, which means I was  
2 looking at a 650-pound batch.

3 Q. Sure.

4 A. Not 750.

5 Q. Okay. All right. So this is where we're at.  
6 Okay. Now, out of the 100 pounds in there of lactation  
7 crumlets, let's just assume that we have the  
8 concentration of NDMA of .22 milligrams per kilogram  
9 parts per million.

10 A. Right.

11 Q. Okay? That means that we also had .1 kilograms  
12 per pound of the lactation crumlets, correct?

13 A. That is correct.

14 Q. Because we've got 2.2 pounds --

15 A. 2.205 pounds per kilogram.

16 Q. Per kilogram. Divide that into -- divide that by  
17 the -- when you do the math it ends up being .1.

18 A. That is correct.

19 Q. Okay. Now, that would mean then that the mixed  
20 ration at 750 pounds is going to have 10 milligrams  
21 total of NDMA.

22 A. That is correct.

23 Q. Okay. Now, if we look at what that pencils out  
24 to be, we're going to divide for just one batch of feed,  
25 we're going to divide 10 milligrams by the 750.

1       A.   And that would give you milligrams per pound, not  
2 milligrams per kilogram.

3       Q.   Correct.  So let's do that math, if you would  
4 please.

5       A.   0.0133333 milligrams per pound.

6       Q.   0.01 --

7       A.   -- 333333.

8       Q.   Okay.  Shall we round it off to 0.013?

9       A.   That will work.

10      Q.   Okay.  0.013 milligrams per pound of mixed  
11 ration.

12      A.   That is correct.

13      Q.   Are you with me so far?

14      A.   Yep.

15      Q.   Mink don't generally eat a pound of feed per day,  
16 do they?

17      A.   A mink will eat, depending upon the water  
18 content, will eat somewhere between 8 percent and about  
19 15 percent of their body weight per day in the material  
20 fed to them, but it depends upon the water content.  And  
21 the higher the water content the larger amount that they  
22 eat per day.

23      Q.   Sure.  On average, though, we're looking at a  
24 mink that's going to eat somewhere around about a third  
25 of a pound of feed per day, if you do it just on

1 average.

2 A. That would be close.

3 Q. Okay. So let's do the math then. And in order  
4 to figure out what the daily exposure rate is in the  
5 feed as fed to these mink we're going to divide this by  
6 3, a third of a pound, because we've got .013 milligrams  
7 per pound, if they eat a third of a pound, we're going  
8 to divide this by 3. So let's go ahead and do that and  
9 see what that comes up to be.

10 A. 0.004.

11 Q. 0.004 milligrams per pound.

12 A. Actually, that's 0.004 milligrams.

13 Q. You're right. The daily exposure rate for the  
14 mink in this case, assuming the level of .22 NDMA in the  
15 mixed ration in the lactation crumlets, was 0.004  
16 milligrams per day, correct?

17 A. Assuming a third of a pound of ingestion per day.

18 Q. Okay.

19 A. That's the reason I like doing it on a dry-weight  
20 basis because you remove the water factor and you can  
21 get more accurate with the intake.

22 Q. Sure. But we're looking at the ration as mixed  
23 and fed to the plaintiffs' animals, and this, assuming  
24 the .22 level in the lactation crumlets, is what their  
25 exposure rate was, and that's the important factor from

1 a toxicological standpoint, correct?

2 A. Actually, no, sir. You're still accounting --  
3 you cannot be as accurate with intake if you include the  
4 water. You would be more accurate doing it on a  
5 dry-matter basis because dry matter intake is more  
6 constant. A wet feed material intake is more variable  
7 depending upon the moisture content, and so you can't be  
8 as precise with your daily exposure rates.

9 Q. But we're going to have dry matter vary with the  
10 water. The more water you have, the less dry matter you  
11 have and vice-versa.

12 A. And the more water you have the more they eat per  
13 day to make up for the fact that it's diluted.

14 Q. Sure.

15 A. And so --

16 Q. But the problem is --

17 THE COURT: Don't overlap. Put your  
18 question, let him respond. Put your next question.

19 Q. (By Mr. Mitchell) I didn't mean to cut you off.  
20 I apologize.

21 A. What I was trying to explain is as you increase  
22 the amount of water, you increase the total amount of  
23 ingestion and decrease the amount of water standalone  
24 that the animals are going to drink on a daily basis.  
25 So you change exposure amounts. That's the reason doing



1 it on a dry-matter basis is much more scientifically  
2 accurate.

3 Q. Okay. So then if we look at this from a  
4 dry-matter standpoint -- let's come back to the dry  
5 matter and let's look at histamines.

6 Oh, also the -- I think the Koppang study is  
7 one of the studies that you relied upon in forming your  
8 opinions. Are you familiar with when I say the Koppang  
9 study what we're talking about?

10 A. I believe Koppang had a couple of different  
11 studies.

12 Q. I'm specifically talking about the study of toxic  
13 and carcinogenic effects of nitrosodimethylamine in  
14 mink.

15 A. Yes, sir.

16 Q. So when we look at the Koppang study does it give  
17 any indication in there of the dry matter concentration?  
18 I'm happy to present you with the article.

19 A. I would love to see it. Actually, they do not  
20 describe dry matter content in their dosings, no, sir.

21 Q. Okay. The doses that they do describe, though,  
22 concentrations in the feed they had actually four  
23 different concentration levels, 2.4 milligrams per  
24 kilogram of NDMA, 3.5 milligrams per kilogram of NDMA,  
25 and 2.2 milligrams per kilogram of NDMA, and the fourth

1 one was 7.2 milligrams per kilogram of NDMA. Is that  
2 your understanding of the concentrations in the feed?

3 A. Actually if I could see the study again. I'm not  
4 sure whether that's the concentrations in the final feed  
5 or whether that's the concentrations in the fish meal  
6 that they used to make the feed that was then further  
7 diluted.

8 Q. I think you are correct, I think you are correct,  
9 it is milligrams per kilogram of the fish meal.

10 A. Actually that's in the fish meal, which is only a  
11 small percentage of the total diet.

12 Q. Okay. And then it got diluted down.

13 A. Where they were actually feeding 0.04 to 0.07, I  
14 believe, in most of the groups.

15 Q. That was what was being consumed on a daily basis  
16 by those mink, correct?

17 A. Correct.

18 Q. And for those mink that were consuming 0.04 all  
19 the way up to 0.08, they had no pathoanatomical changes  
20 at the end of the study, correct?

21 A. That was not my understanding from the study, no,  
22 sir.

23 Q. Okay. So let me show you the study again. Just  
24 talking about the animals that consumed at the rate of  
25 0.04 all the way up to 0.08.

1       A.    Okay.  Yes, sir, that is correct, and as  
2   extremely low exposures.

3       Q.    Okay.  How long did that study last?

4       A.    There were differing time points in that study.  
5   I mean that particular research project there were some  
6   animals that were fed shorter periods of time, there  
7   were some animals that were fed an extremely long period  
8   of time.  And without having the article sitting right  
9   here at my hands to where I can make sure we're  
10  comparing apples and apples, those specific three dosing  
11  groups, or four dosing groups, I need to see the study  
12  to be able to tell you exactly how many days they were  
13  dosed.

14       Q.    So if we look at this study right here, so we're  
15  looking at the portion that's embodied in table 2, it  
16  looks to me like they were fed 122 days at those rates.  
17  Is that how you read that able?

18       A.    That is correct.

19       Q.    So for the three groups that were fed for 122  
20  days levels from .04 to .08 milligrams per kilogram of  
21  body weight per day of NDMA we had no changes in their  
22  system.

23       A.    There was no pathologic lesions described,  
24  correct.

25       Q.    Okay.  And it's only when we get up to the lowest

1 level where we find changes being a .13.

2 A. That is correct.

3 Q. Within that study. Okay.

4 A. Your original question was how long were they  
5 fed, that was a 122-day study.

6 Q. Correct. So all of those were fed for 122 days.  
7 How many days were the mink in this case exposed to  
8 NDMA?

9 A. Less than 60 days was my understanding.

10 Q. If we count, let's assume, April 25th to  
11 June 7th, by my count that's 44 days.

12 A. 44, 45 days, yeah.

13 Q. So roughly a third of the time that the mink in  
14 the Koppang study were exposed.

15 A. That's correct.

16 Q. Okay. This is the description of how the  
17 plaintiffs prepared their mixture every day once they  
18 got it fully incorporated. Have you done anything to  
19 look at what their actual incorporation rate was, what  
20 it averaged over the entire time that they fed the  
21 lactation crumlets to their mink?

22 A. The answer to my question is the same as I  
23 answered earlier, I was not provided information on  
24 their delivery load, so there was no way for me to  
25 calculate from that data. The inclusion rate was

1     calculated based on information provided to me by the  
2     Jonssons.

3         Q.    Okay.  And so that answers that question.

4               Now, when we look at the concentrations of  
5     histamines, have you been able to -- let me back up a  
6     minute.  Is it correct, or am I correct in my  
7     understanding that histamines are formed by the  
8     conversion of histidine through a bacterial process?

9         A.    It's usually through a bacterial process, yes,  
10    sir.

11        Q.    Now, have you done -- and that's normally why you  
12    would expect to see histamine levels fall off over time  
13    because that bacteria that would normally convert the  
14    histidine gets cooked out when you make fish meal.

15        A.    That is true to some degree, but there are  
16    studies showing that the histamine concentrations  
17    decrease across time even in significantly contaminated  
18    samples.

19        Q.    Right.  And so have you done anything to look at  
20    the sampling techniques that were employed by the  
21    Griffeths in this case to rule out the potential for  
22    cross-contamination and the reintroduction of the  
23    bacteria that would lead to the creation of additional  
24    histamine levels over time?

25        A.    I have not looked at that, no, sir.  I was not

1     there when they sampled it, and so there's no way I can  
2     control for that.

3         Q.    Okay.  You are unable to tell us with any  
4     certainty what the level of histamines would have been  
5     in the lactation crumlets at the time that it was fed to  
6     the Jonssons' mink, correct?

7         A.    I am not able to say with certainty.  I can say  
8     that the concentrations were, within a reasonable degree  
9     of scientific certainty, higher than various  
10    concentrations that were identified during the analyses.

11        Q.    So let's take a look at your deposition page  
12    110 --

13               THE COURT:  Are you about through with him?

14               MR. MITCHELL:  I can be.  I mean I could  
15    be -- I've got a little bit more I think, but this is a  
16    good stopping place.

17               THE COURT:  Let's see if you can finish him.  
18    Let's finish.

19               MR. MITCHELL:  Okay.

20               THE WITNESS:  You said page 110, sir?

21        Q.    (By Mr. Mitchell) Page 110.  Page 110, starting  
22    on line 10.  Okay.  And so are you able to tell us with  
23    any certainty what the level of histamines would have  
24    been in the feed at the time it was fed to the Jonssons  
25    mink?

1 Answer, No, sir.

2 Did I read that correctly?

3 A. With certainty I cannot.

4 Q. Did I read the deposition correctly?

5 A. Yes, you read the deposition correctly.

6 Q. Okay. Thank you.

7 Now, when you calculated the histamine  
8 concentrations in the studies that you looked at in the  
9 histamines -- for histamines are those studies done on  
10 an as fed or on a dry-matter basis?

11 A. Actually when I went back and looked at those,  
12 those studies were done on an as-fed basis, so they did  
13 not need to be converted to a dry weight.

14 Q. So let's do the math again. So which study did  
15 you look at and rely upon principally for reaching your  
16 conclusion with regard to the histamine levels present  
17 in the lactation crumlets?

18 A. I don't remember the author's name. It was the  
19 one that I provided to you.

20 Q. No. I mean when I say study, I mean the analysis  
21 that was done in this case.

22 A. What I like to do is I like to look at all  
23 possibilities, but then you always want to calculate  
24 worst case scenario.

25 Q. So we can run the gamut. We have the very first

1 test that was done that didn't detect any. If you don't  
2 detect any, there's nothing there to go from.

3 A. Right.

4 Q. So let's look then at the worst case scenario,  
5 what's the worst case scenario?

6 A. That was a concentration that determined to be  
7 400 and --

8 Q. I believe it was 442?

9 A. Yes, sir.

10 Q. So for every, let's assume worst case scenario,  
11 every 750-pound batch of feed has 100 pounds of  
12 lactation crumlets with 442 parts per million of  
13 histamines in it.

14 A. That's correct.

15 Q. Okay. It's my understanding that if we take --  
16 it's going to dilute this number down by the same  
17 percentage that we're looking at here. So I didn't  
18 answer that -- walk me through -- I didn't ask that  
19 question very well. It's the end of the day. Walk me  
20 through the math then to figure out what the  
21 concentration level is assuming -- in the mixed ration  
22 assuming the 442 million -- parts per million level.

23 A. Okay. The easiest way to do it is to take 100  
24 and divide it by 750.

25 Q. And that's going to give us 13 -- roughly



1 13.3 percent I believe.

2 A. Then multiply that by the 442.

3 Q. So if we go 442 -- in fact do you still have --  
4 nope. Let's be precise, figure out exactly what the  
5 percentage is first. What does 100 divided by 750 work  
6 out to be?

7 A. 0.1 -- 0.1333.

8 Q. Okay. So we were -- I was right, so  
9 13.3 percent. So then let's multiply that by that.

10 A. Is 58.933.

11 Q. 58.933 parts per million worst case scenario,  
12 assuming a 750-pound batch of feed.

13 A. As fed.

14 Q. As fed.

15 A. Correct.

16 Q. So just a whisker above the level that your  
17 studies -- that the studies that you reviewed looked at  
18 found might cause some harm to mink.

19 A. There again those were in nonpregnant mink, and  
20 we don't know the relative sensitivity of pregnant mink  
21 as a comparison.

22 Q. Right, we don't know.

23 A. Right.

24 Q. Could be the same, could be more, we don't know.

25 A. Correct.

1 Q. The studies you've looked at 50 parts per million  
2 is where you start seeing effects in the mink?

3 A. That is correct.

4 Q. Okay. We're just a whisker above that, worst  
5 case scenario, in the total mixed ration. And what are  
6 the kinds of signs that you would expect to see at that  
7 low level?

8 A. You wouldn't necessarily see the vomiting and  
9 diarrhea. You would see a slight decrease in feed  
10 intake, a decrease in weight gain, a decrease in growth  
11 rate.

12 Q. Have you seen any evidence of decreased weight  
13 gain in these mink?

14 A. The animals weren't weighed, so there's no  
15 documentation.

16 Q. What was the other one that you mentioned?

17 A. Decreased feed intake.

18 Q. Decreased feed intake. We've talked about --

19 A. That was not measured as well.

20 Q. And then there was a third one I think.

21 A. Decreased feed intake, decreased rate of gain,  
22 and decreased growth rate. And where you're talking  
23 adult animals, they're already grown, and so that  
24 becomes a nonvariable.

25 Q. Is there a difference between growth rate and

1 rate of gain?

2 A. Not really.

3 Q. Okay. All right.

4 From the studies that you have seen, from  
5 the studies that are out there, would you expect to see  
6 any deaths resulting from histamines at that level?

7 A. Not with histamines by themselves, no.

8 Q. All right.

9 MR. MITCHELL: I believe those are all the  
10 questions I have for you right now. Thank you,  
11 Dr. Hall.

12 MR. HANCEY: Your Honor, I've got redirect.  
13 It's 5:05. Should I start on that?

14 THE COURT: Well, give me your estimate, how  
15 long?

16 MR. HANCEY: It could be as much as a half  
17 an hour, Your Honor.

18 THE COURT: 9:30 tomorrow, ladies and  
19 gentlemen, come in at 20 minutes after 9:00, and we'll  
20 get started right at 9:30. Remember what I told you,  
21 don't talk to anybody about the case. I appreciate your  
22 help. You may be excused.

23 (Whereupon, the following proceedings were  
24 held in open court outside the presence of  
25 the jury.)

1           THE COURT: After this witness, who else  
2 have we got?

3           MR. HANCEY: Well, Your Honor, we've got two  
4 representatives of Rangen, who I understand will be  
5 available tomorrow, they will be very short witnesses.  
6 We have two National representatives we wanted to take  
7 tomorrow, but we've been informed they're not going to  
8 be available until later on.

9           THE COURT: Tomorrow's the time. Why aren't  
10 they here tomorrow?

11          MR. MINNOCK: Your Honor, there is another  
12 case dealing with feed going on in the Federal District  
13 Court of Wisconsin in the Eastern District, those two  
14 are there tomorrow to start that trial, and then they  
15 will end -- one of them is the witness we talked about  
16 that is going to be here next Tuesday, but the other one  
17 will be here Thursday morning.

18          MR. HANCEY: And our last witness is going  
19 to be the economist, Dr. Roberts. If all goes as  
20 planned, we'll probably run out of witnesses tomorrow.

21          THE COURT: Well, we won't run out of  
22 witnesses. You get your witnesses here. We're going to  
23 plow ahead. That's what we planned for.

24          MR. HANCEY: Well, Your Honor, what I mean  
25 is we'll have accounted for all of the witnesses except

1 for the National Feeds representatives that are --

2 THE COURT: Are you bringing them in as a  
3 part of your defense?

4 MR. MINNOCK: Yes.

5 THE COURT: And when are you going to have  
6 them here as part of your defense if they finish up  
7 tomorrow?

8 MR. MINNOCK: Well, assuming that the  
9 Wisconsin one goes as scheduled, then Ed Buschur will be  
10 here first thing Thursday morning and then Dre Sanders  
11 will be here first thing Tuesday. We do anticipate  
12 calling witnesses in the interim, this is something we  
13 had talked about, so we will have witnesses ready  
14 Thursday.

15 THE COURT: Well, let's plow ahead, do the  
16 best we can.

17 MR. HANCEY: Very good, Your Honor.

18 THE COURT: As a matter of curiosity, is it  
19 the same kind of case in Wisconsin?

20 MR. MINNOCK: It deals with a different  
21 issue dealing with some feed that came out of a company  
22 called United Pet Food in Indiana, but it was under the  
23 name of National Feeds and so it deals with --

24 THE COURT: A different product?

25 MR. MINNOCK: Yes, it's a different product.

1 It's 100 percent diet thing, different product,  
2 different manufacturer, and it's back in Wisconsin.

3 THE COURT: Okay.

4 MR. MINNOCK: Oh, I'm sorry, Your Honor, I  
5 just got a text from these two witnesses, they just  
6 texted me that that case has settled, so we'll keep you  
7 up-to-date. We'll get them here as fast as we can.

8 THE COURT: You'll have them here?

9 MR. MINNOCK: I hope.

10 THE COURT: I hope so too.

11 (Whereupon, the matter was continued to  
12 Wednesday, January 15, 2014, at 9:30 a.m.)

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C E R T I F I C A T E

State of Utah

County of Salt Lake

I, Karen Murakami, a Certified Shorthand Reporter for the State of Utah, do hereby certify that the foregoing transcript of proceedings was taken before me at the time and place set forth herein and was taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision;

That the foregoing pages contain a true and correct transcription of my said shorthand notes so taken.

IN WITNESS WHEREOF, I have hereunto set my hand this 20th day of January , 2014.

Karen Murakami

Karen Murakami, CSR, RPR